EL PASO UTEP (CAMS 12) MONITORING SITE

JUNE 21, 2015

EXCEPTIONAL EVENT DEMONSTRATION PACKAGE
For the El Paso County Maintenance Area

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
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LIST OF ACRONYMS

AGL	Above Ground Level
AIRS	Aerometric Information Retrieval System
AOD	Aerosol Optical Depth
AQI	Air Quality Index
AQS	Air Quality System
ARL	Air Resources Laboratory
CAA	Clean Air Act
CAMS	Continuous Air Monitoring Station
CFR	Code of Federal Regulations
CO	Carbon Monoxide
EPA	Environmental Protection Agency
EER	Exceptional Events Rule
ºF	degrees Fahrenheit
FCAA	Federal Clean Air Act
GOES	Geostationary Operational Environmental Satellite
HYSPLIT	Hybrid Single Particle Lagrangian Integrated Trajectory
km	Kilometer
LEADS	Leading Environmental Analysis and Display System
LST	Local Standard Time
ly/min	Langley/minute
m	Meter
MDA8	Daily Maximum 8-hour Average
MDT	Mountain Daylight Time
MODIS	Moderate Resolution Imaging Spectroradiometer

NAAQS	National Ambient Air Quality Standards
NAM	North American Mesoscale Forecast System
NARR	North American Regional Reanalysis
NASA	National Aeronautics and Space Administration
NCAR	National Center for Atmospheric Research
NCEP	National Centers for Environmental Prediction
nm	Nanometer
NOAA	National Oceanic and Atmospheric Administration
NO_X	Nitrogen Oxides
NO2	Nitrogen Dioxide
NWS	National Weather Service
OC	Organic Carbon
PM	Particulate Matter
PM2.5	Fine Particulate Matter less than or equal to 2.5 microns in diameter
PM10	Particulate Matter less than or equal to 10 microns in diameter
ppb	parts per billion
ppm	parts per million
RDAS	Regional Data Assimilation System
SIP	State Implementation Plan
TCEQ	Texas Commission on Environmental Quality
TOMS	Total Ozone Mapping Spectrometer
U.S.	United States
UTC	Coordinated Universal Time
UTEP	University of Texas at El Paso
VOC	Volatile Organic Compounds

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EXECUTIVE SUMMARY

On June 21, 2015, the El Paso University of Texas at El Paso (UTEP) (CAMS 12) monitoring site measured a maximum daily eight-hour average ozone concentration of 77 parts per billion (ppb) during the period from 11:00 AM to 7:00 PM Local Standard Time (12:00 to 8:00 Mountain Daylight Time). Pollutants from wildfires in southwestern New Mexico and eastern Arizona were transported to El Paso and raised ozone levels at the site beyond what they would otherwise have been. This maximum daily average creates an exceedance of the 2015 eight-hour ozone National Ambient Air Quality Standard (NAAQS) of 0.07 parts per million and results in the El Paso area having a 2015 eight-hour ozone design value of 71 ppb. This exceptional event could lead to a nonattainment designation for the El Paso area based on its 2015 or 2016 eight-hour ozone design values.

Based on an initial analysis, the Texas Commission on Environmental Quality (TCEQ) entered a preliminary flag and notified the United States Environmental Protection Agency (EPA) as required by the Exceptional Events Rule (EER). The TCEQ submits this Exceptional Events Demonstration Package in support of the claim that the El Paso area experienced an exceptional event on June 21, 2015, which caused an exceedance of the 2015 eight-hour ozone NAAQS. The TCEQ requests that the EPA concur with the technical demonstration contained in this document and enter an exceptional event concurrence flag for the appropriate Air Quality System (AQS) data records for the El Paso UTEP (CAMS 12) ozone measurements taken June 21, 2015.

The TCEQ's determination is substantiated through the accumulated weight of evidence documented in this package. Specifically, the fires occurring in Arizona and New Mexico:

- affected air quality in the El Paso area by causing elevated levels of ozone, fine particulate matter ($PM_{2.5}$), and carbon monoxide (CO);
- were not reasonably preventable or controllable by the State of Texas, because they occurred outside the state's borders;
- were caused by lightning and human activity, are natural and human related events, and not likely to recur at a particular location;
- are associated with satellite imagery, Hybrid Single--Particle Lagrangian Integrated Trajectory (HYSPLIT) backwards trajectories, visual imagery, and surface monitoring data that show a clear causal relationship between the fires and the monitored concentrations;
- are associated with measured concentrations in excess of normal historical fluctuations including background; and
- caused an exceedance of the 2015 eight-hour ozone NAAQS that would not otherwise have occurred.

CHAPTER 1: INTRODUCTION

On June 21, 2015, the El Paso University of Texas at El Paso (UTEP) (CAMS 12) monitoring site measured a maximum daily eight-hour ozone average of 77 parts per billion (ppb). This eight-hour period began at 11:00 AM Local Standard Time (LST) and lasted until 7:00 PM LST. The ozone average during this period was punctuated by two consecutive one-hour averages of 97 ppb. These measurements were elevated by emissions from the Hog fire in southeastern Arizona, which were transported approximately 155 miles across the deserts of New Mexico and Mexico before entering the El Paso area from south. Additional fires in eastern Arizona also contributed emissions. This demonstration will show that the Hog fire in Arizona caused the measured ozone exceedance in El Paso. The Texas Commission on Environmental Quality (TCEQ) requests that the United States Environmental Protection Agency (EPA) concur with its findings and exclude ozone measurements taken at the El Paso UTEP (CAMS 12) monitoring site from comparison to the 2015 eight-hour ozone National Ambient Air Quality Standard (NAAQS).

1.1 EL PASO CONCEPTUAL MODEL

On June 21, 2015, at approximately 11:00 AM (LST), ozone levels at the El Paso UTEP (CAMS 12) monitoring site began increasing. Emissions from the Hog Fire in southeastern Arizona had been arriving all morning, but in the early afternoon emissions from fire entered the El Paso area containing one-hour ozone concentrations of 97 ppb. For almost the whole morning and afternoon, NO_2 made up over 90 percent of the NO_X measured at El Paso Chamizal (CAMS 41) monitoring site indicating that the ozone had been transported from outside the El Paso area and was not produced locally. These emissions can be traced directly back to the vicinity of the Hog Fire.

El Paso, Texas, is located at the western-most tip of the state. El Paso and Ciudad Juarez, Mexico lie on opposite sides of the U.S.-Mexico international border and are immediately adjacent to each other. The population of El Paso is approximately 835,000 and the population of Ciudad Juarez is above 1.3 million. El Paso is also home to a major U.S. Army installation, Fort Bliss. The post is over 1.12 million acres in size, and the installation is home to over 38,500 active duty military personnel. Despite its increasing population and its proximity to Ciudad Juarez, El Paso has made significant progress in reducing ozone over the long term. Figure 1-1: *El Paso Area Annual Ozone Design Value 2000-2015*, shows that El Paso has improved its annual design value from 80 ppb to 71 ppb.

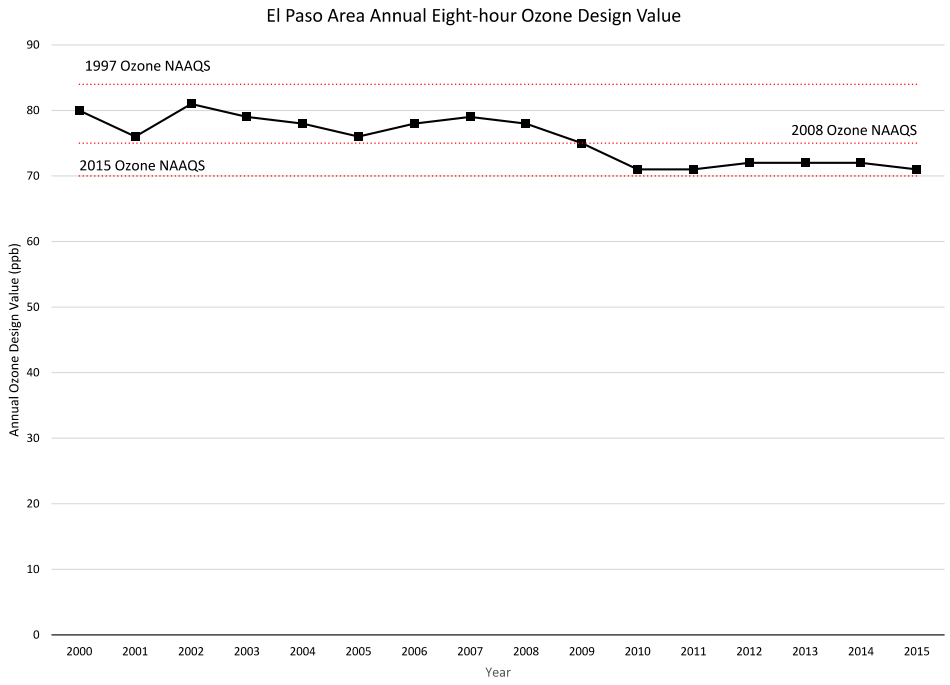

Figure 1-1: El Paso Area Annual Ozone Design Value 2000-2015

El Paso is situated in a mountain range that divides the city into two parts, and Ciudad Juarez has a mountain range located south of the city. This mountainous topography influences wind flow in both cities. The Rio Grande River separates the two cities and creates a low point, or valley, between them that channels the wind and further influences wind flow around the city.

There are three major international ports of entry into El Paso – the Paso Del Norte, Stanton, and Zaragoza (Ysleta) bridges. The border crossings connect the two cities and represent the world's largest international border metropolitan area[1]. According to El Paso's International Bridges Department, more than 3.6 million passenger vehicles, 4.2 million pedestrians, and 300,000 commercial vehicles cross into Ciudad Juarez each year.

In El Paso, mobile source emissions make up the majority of nitrogen oxides (NO_X) emissions, while mobile and area make up the majority of volatile organic compound (VOC) emissions. Figure 1-2*: El Paso County Total VOC and NOX Emissions*, shows that overall NO_X and VOC emissions have steadily decreased over the past 14 years. There is currently limited information regarding ozone precursors in Ciudad Juarez; however, historic NO_X inventories show a high percentage of mobile source emissions (Li et. al., p. 6-39). Both cities are dominated by area and mobile source emissions, and Ciudad Juarez may have larger area and mobile source emissions because of population and fewer programs currently in place to control those sources.

[1] https://www.elpasotexas.gov/international-bridges

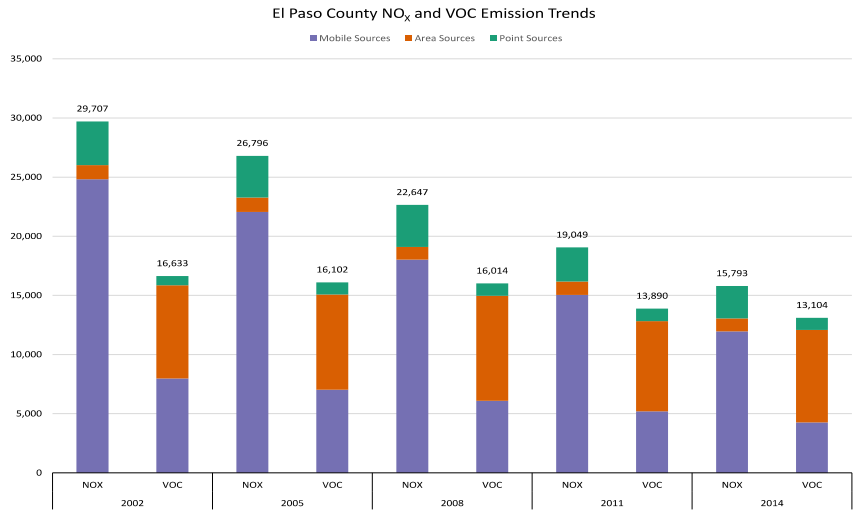

Figure 1-2: El Paso County Total VOC and NO_X Emissions

Past research has shown that high-ozone days in El Paso County are characterized by high solar radiation, high temperatures (above 85 degrees Fahrenheit), light winds, and wind directions from the south-southeast. Meteorological modeling indicates that ozone levels are correlated negatively with morning mixing heights and positively with afternoon mixing heights (Li et. al., pp. 4-25 – 4-27).

High ozone days (maximum daily eight-hour average concentration greater than 70 ppb) in El Paso County generally occur May through September but have also been measured in April and as early as March. The most frequent months are June, August, and September. Maximum daily ozone concentrations usually occur near midday. The highest maximum daily ozone concentrations in the area tend to be measured along the Rio Grande river valley (the U.S./Mexico border) (Li et. al., p. xix).

1.2 THE EL PASO UTEP (CAMS 12) MONITORING SITE

The El Paso UTEP (CAMS 12) monitoring site is located just north of downtown El Paso on the campus of the University of Texas at El Paso (See Figure 1-3: *Location of the El Paso UTEP (CAMS 12) Monitoring Site*). It has been active since January 1, 1981. Siting and instrumentation information for the El Paso UTEP (CAMS 12) monitoring site is shown in Table 1-1: *El Paso UTEP (CAMS 12) Monitoring Site Information*. The El Paso UTEP (CAMS 12) monitoring site has been the ozone design value monitor for the El Paso area since 2010.

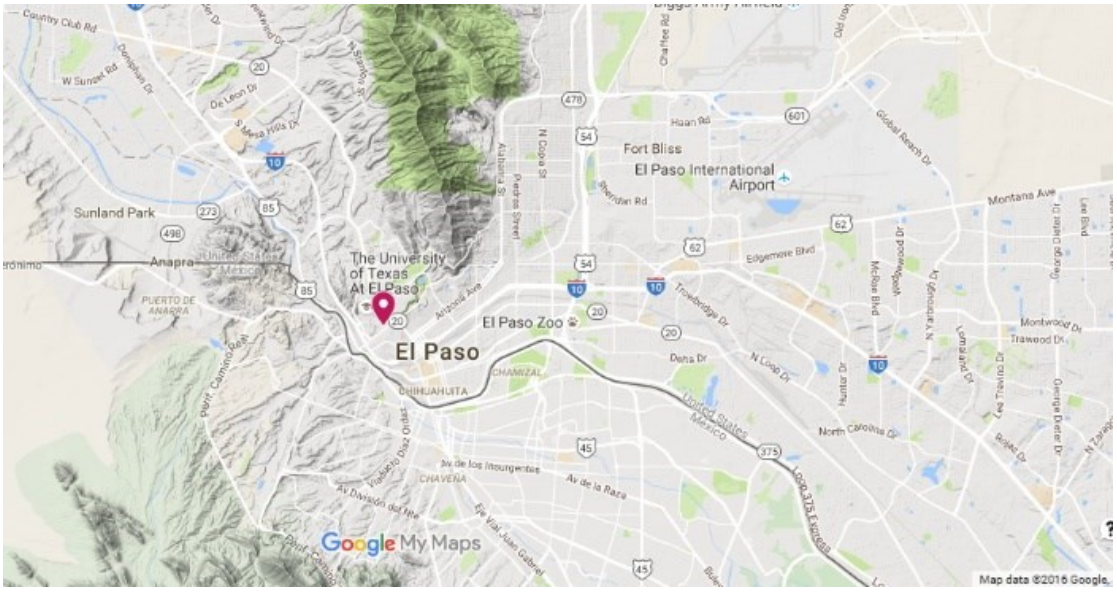

Figure 1-3: Location of the El Paso UTEP (CAMS 12) Monitoring Site

Table 1-1: El Paso UTEP (CAMS 12) Monitoring Site Information

El Paso UTEP Continuous Air Monitoring Site 12 (CAMS 12)
AQS Number: 481410037
Active Since: January 1, 1981
Address: 250 Rim Rd., El Paso, TX 79902
Lat/Lon: N 31.7682914 º W 106.5012595º
Elevation: 1158.0 meters
Instrumentation: pollutants - ozone, nitrogen oxides, sulfur dioxide, total suspended particles (lead), PM_{10} (TEOM), $PM_{2.5}$ (TEOM), $PM_{2.5}$ (FRM); meteorology – winds, outside temperature, dew point temperature, relative humidity, precipitation, solar radiation, ultraviolet radiation

1.3 FIRES RELATED TO JUNE 21, 2015 EXCEEDANCE IN EL PASO

Based on its analysis of Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model trajectories from various fires and the El Paso UTEP (CAMS 12) monitoring site, the TCEQ has identified a wildfire in Arizona as the cause of the June 21, 2015, ozone exceedance at the El Paso UTEP (CAMS 12) monitoring site. The Hog fire started from a lightning strike early on June 17, 2015. It was located in the Coronado National Forest (Douglas Ranger District) very close to the Arizona-New Mexico border. The fire's location is approximately 155 miles west of El Paso. By the end of the fire on June 25, 2015, it had burned approximately 8,000 acres of grass, brush, and mesquite (National Wildfire Coordination Group, 2015). Evidence suggests that several other fires further north and west in Arizona may have also contributed to the maximum daily eight-hour average ozone concentration of 77 ppb measured at the El Paso UTEP (CAMS 12) monitoring site on June 21, 2015. Additional information regarding these fires can be found in Table 1-2: *Fires Contributing to El Paso Exceptional Event*. Approximate geographic locations can be found in Figure 1-4: Geographic Location of Fires Contributing to El Paso Exceptional Event.

Table 1-2: Fires Contributing to El Paso Exceptional Event

Fire Name	Location (Lat/Lon)	Size (acres)	Cause	Start Date	End Date
Primary Fire					
Hog Fire	N 31.503 º W 109.089 º	8,000	Lightning	6/17/2015	6/25/2015
Contributing Fires					
Whitetail Complex	N 33.574 º W 110.246 º	33,633	Lightning	6/16/2015	6/29/2015
Sawmill	N 33.507 º W 109.932 º	5,667	Lightning	6/17/2015	6/29/2015
Kearny River	N 33.050º W 110.917 º	1,428	Human	6/17/2015	6/27/2015
Saguaro	N 32.340 º W 109.784 º	119	Human	6/18/2015	6/20/2015

In the following chapters, the TCEQ will show that the Hog fire, with contributions from at least four other fires, caused the measured exceedance of the 2015 eight-hour ozone NAAQS of 0.070 parts per million. The TCEQ will also show that this event meets the requirements of the exceptional events rule. Based on this demonstration, the TCEQ requests that the EPA concur with the TCEQ's findings.

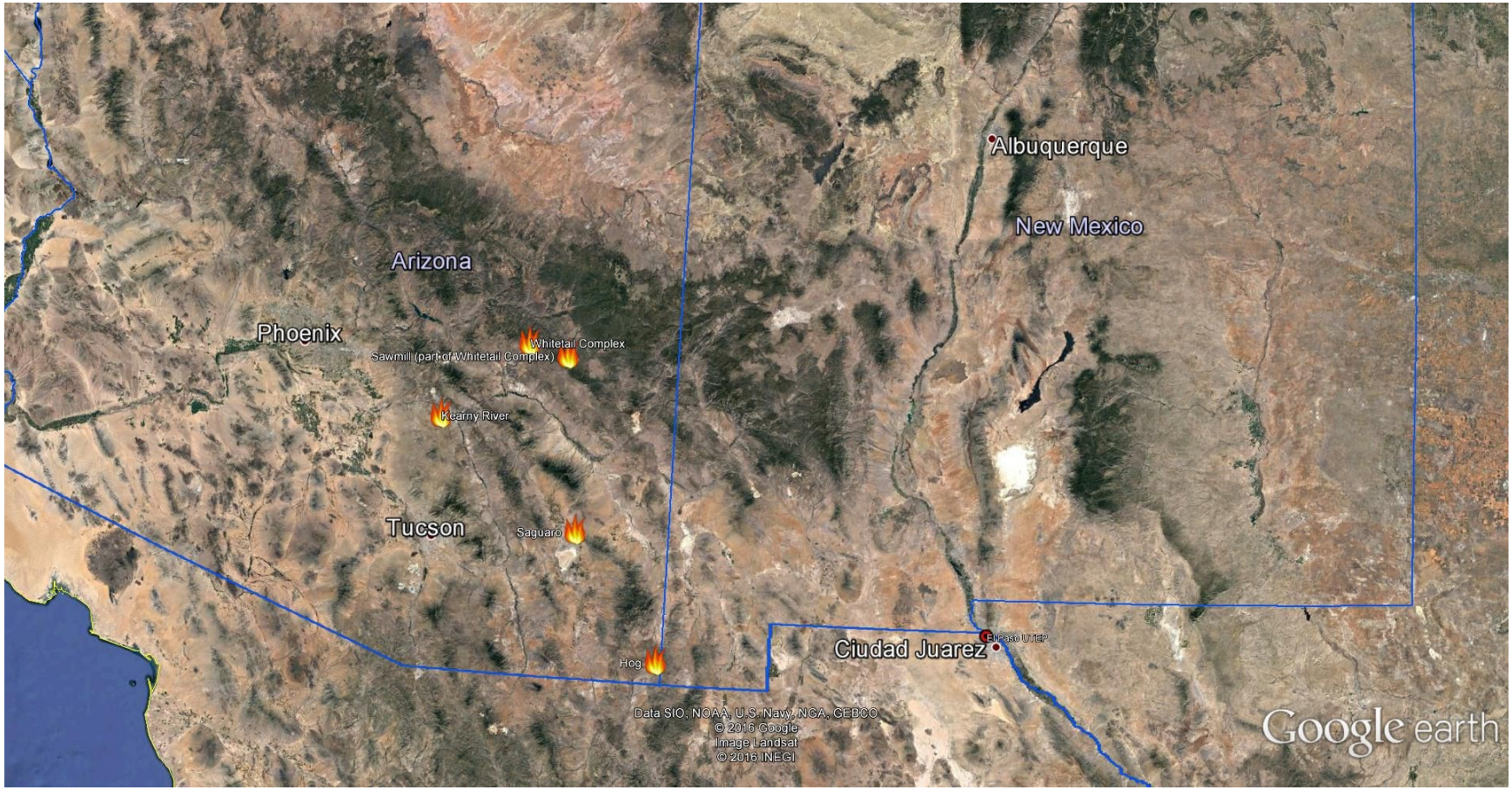

Figure 1-4: Geographic Location of Fires Contributing to El Paso Exceptional Event

CHAPTER 2: EXCEPTIONAL EVENT REQUIREMENTS FOR STATES

2.1 RELEVANT REGULATORY DOCUMENTS

There are four notable regulatory activities by the United States Environmental Protection Agency (EPA) that address exceptional event demonstration requirements:

- the 2007 Exceptional Events Rule (EER);
- the proposed 2015 revisions to the 2007 EER;
- the draft *Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations;* and
- the EPA Memorandum, Area Designations for the 2015 Ozone National Ambient Air Quality Standards.

2.2 REQUIREMENTS FOR AN EXCEPTIONAL EVENT

On March 22, 2007, the EPA published the EER which provided a process that allowed states to request that the EPA exclude monitoring data showing exceedances or violations of a criteria pollutant National Ambient Air Quality Standard (NAAQS) directly related to an exceptional event (72 Fed. Reg. 13560 March 22, 2007). When a state identifies a possible exceptional event, it places a "flag" in the appropriate field of the data record in question for informational purposes. Prior to July 1 of the year following a state's placement of the informational flag, it must inform the EPA of the flag and provide an initial reason for its placement. From that point, a state has three years after the quarter in which the flagged data were reported to the EPA to submit (after notice and opportunity for public comment) a demonstration package to the EPA showing the reasons that the event should be considered exceptional. If the EPA is satisfied with the state's demonstration package, it places a concurrence flag in the appropriate field and record in the Air Quality System (AQS) database.

The EER specifies at 40 Code of Federal Regulations (CFR) §50.14(c)(3)(iv) that states requesting to exclude monitoring data from consideration based on exceptional events must provide evidence that:

- the event satisfies criteria set out in the definition of exceptional event (40 CFR §50.1(j));
- there is a clear causal relationship between the measurement under consideration and the event;
- the event is related to a measured concentration in excess of normal historical fluctuations;
- there would have been no exceedance but for the event; and
- the public comment process was followed.

The EPA defines "exceptional event" in the EER (40 CFR §50.1(j)) as an event that:

- affects air quality;
- is not reasonably controllable or preventable; and
- is an event caused by human activity that is unlikely to recur at a particular location or a natural event, and is determined by the Administrator to be an exceptional event.

Additionally, the EER (40 CFR §51.930) requires that a state requesting a concurrence on an exceptional event day must take "appropriate and reasonable actions to protect public health from exceedances or violations of the national ambient air quality standards." A state, at a minimum, must:

- Provide for prompt public notification when air quality concentrations are expected to exceed an applicable ambient air quality standard.
- Provide for public education regarding actions that individuals may take to reduce exposures to unhealthy levels of air quality during and following an exceptional event.
- Provide for implementation of appropriate measures to protect health from exceedances or violations of ambient air quality standards caused by exceptional events.

2.3 PROPOSED CHANGES TO EXCEPTIONAL EVENTS POLICIES

On November 20, 2015, the EPA proposed revisions to the 2007 EER and announced the availability for public comment of a draft guidance document that applies the proposed rule revision to wildfire events that could influence monitored ozone concentrations (80 Fed. Reg. 72839 November 20, 2015). Highlights of the proposal include:

- more clearly defining the scope of the EER to apply only to certain types of regulatory actions;
- revising the rule language to more closely align with the language in the FCAA;
- removing the requirement for states to show that there would have no exceedance or violation but for the event;
- relying on SIP controls to satisfy the "not reasonably controllable or preventable" criterion provided the EPA has approved the SIP within the last five years;
- clarifying the analyses, content, and organization for exceptional events demonstrations;
- requiring an initial notification by the state to the EPA of a potential exceptional events request;
- removing the specific deadlines that apply in situations other than initial area designations following promulgation of a new or revised NAAQS; and
- clarifying fire-related definitions and demonstration components.

The EPA stated its intent to finalize these rule revisions before October 1, 2016, which is the date by which states, and any tribes that wish to do so, are required to submit their initial designation recommendations for the 2015 eight-hour ozone NAAQS. At the same time the EPA announced the availability for public comment of the draft *Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations* (EPA, November 10, 2015). The EPA anticipated finalizing the guidance on the same schedule as the revised rule making. The draft guidance includes example analyses, conclusion statements, and technical tools that air agencies can use to provide evidence that a wildfire event influenced a monitored ozone concentration(s). In particular the guidance identifies characteristics (e.g., season of occurrence, fire emissions, the fire's distance from the ozone monitor, and how high ozone levels reached during the fire) that could enable an air agency to submit a simpler and less resource-intensive demonstration package.

On February 25, 2016, the EPA released a memorandum, *Area Designations for the 2015 Ozone National Ambient Air Quality Standards* (EPA, February 25, 2016). The purpose of the memorandum is to provide information on the schedule and process for initially designating areas for the purpose of implementing the 2015 primary and secondary eight-hour ozone NAAQS. The memorandum includes a discussion of exceptional events and designations.

2.4 EXCEPTIONAL EVENTS AND DESIGNATIONS

When certain criteria are met, the FCAA and the EPA's implementation regulations specified in the EER allow for the exclusion of air quality monitoring data from design value calculations when there are exceedances caused by exceptional events. Excluding data influenced by an

exceptional event affects initial area designations and nonattainment classifications for the 2015 eight-hour ozone NAAQS.

In the 2015 eight-hour ozone NAAQS final rule (80 Federal Register 65291 October 26, 2015), the EPA established schedules for air agencies to flag data influenced by exceptional events and submit related documentation for data that will be used in the initial designations process for the 2015 eight-hour ozone NAAQS. Although some of these deadlines are accelerated compared to the general schedule timelines in the 2007 EER, they were promulgated to align closely with the timing of the initial designation recommendations from states and tribes in October 2016 and/or the EPA expected issuance of 120-day letters pertaining to designation by June 2017. "These schedules reflect the EPA's interests in ensuring that we can fully consider exceptional events claims that could influence the final designations [*sic*] decisions."

The EPA memo of February 25, 2016, encourages regional offices to work with states and tribes with exceptional events claims to prioritize and expedite the demonstration development and review process for those claims that have the potential to influence regulatory decisions, such as the initial designations process. Attachment 2 of this memo provided the schedule for documentation submissions and is shown in Table 2-1: *Revised Schedule for Exceptional Event Submissions*.

Table 2-1: Revised Schedule for Exceptional Event Submissions

Air Quality Data Collected for Calendar Year	Event Flagging & Initial Description Deadline	Detailed Documentation Submission Deadline
2013, 2014, 2015	July 1, 2016	October 1, 2016
2016	May 31, 2017	May 31, 2017

The proposed 2015 EER revisions have been finalized, but not published. The accompanying guidance was published as final on September 16, 2016. On June 23, 2016, the EPA delivered a draft final rule for review by the Office of Management and Budget. Based on consultation with EPA Region 6, the TCEQ was advised to develop this technical demonstration based on rules and guidance currently in place. The detailed documentation submission deadline of October 1, 2016, makes it necessary for the Texas Commission on Environmental Quality (TCEQ) to follow the 2007 EER and guidance in developing this demonstration.

2.5 RESPONSES TO EXCEPTIONAL EVENT RULE REQUIREMENTS

The following section summarizes the TCEQ's adherence to the EER guidance and presents the necessary evidence and additional information to support flagging ozone data at the El Paso UTEP (CAMS 12) monitoring site as impacted by an exceptional event on June 21, 2015. Consistent with the interim guidance of 2013 (EPA, 2013, p. 2), the TCEQ relies on a weight of evidence approach for its demonstration. As the EPA notes in the guidance (U.S. EPA, 2013, p. 2), the different requirements are inter-related, and thus, sections of this demonstration may support more than one requirement and may refer to other sections of the demonstration package. Chapter 3: The Exceedance of June 21, 2015, of this document provides a more detailed demonstration of how data from June 21, 2015 meet the rule requirements that:

- the event is related to a measured concentration in excess of normal historical fluctuations;
- there is a clear causal relationship between the measurement under consideration and the event; and
- there would have been no exceedance but for the event.

The event under consideration is the wildfire-induced exceedance of the 2015 eight-hour ozone NAAQS measured at the El Paso UTEP (CAMS 12) monitoring site on June 21, 2015. Consequently, the TCEQ is submitting this event as an exceptional event under the 2015 ozone NAAQS.

When the EPA published the final version of the EER on March 22, 2007, (72 Fed. Reg. 13569 March 22, 2007) it noted in the preamble that:

> "The final rule permits a case-by-case evaluation, without prescribed threshold criteria, to demonstrate that an event affected air quality. The demonstration would be based on the weight of available evidence, but must consider the historical frequency of such measured concentrations. While a State may determine the specific approach to use for such analysis, it must compare contemporary concentrations with the distribution of all measured data during the past several years."

The June 21, 2015, event did affect air quality as evidenced by the observations detailed in this demonstration. First, the event occurring on this day was well outside the normal historical fluctuations of recent monitored values. The maximum eight-hour average ozone concentration at the El Paso UTEP (CAMS 12) monitoring site on this day was 77 parts per billion (ppb). As demonstrated in Figure 3-3: *Percent Rank of June 21, 2015, based on Year-round Data*, and Figure 3-4: *Percent Rank of June 21, 2015, based on Ozone Season Data*, this maximum ranks above the 99th percentile when considering the population of maximum daily eight-hour measurements for a contemporary period of 2010 through 2015, which contains over 700 days at this monitoring site (EPA, 2013, p.5). The Hog fire in southeastern Arizona produced significant amounts of ozone precursors. Winds transported these emissions to the El Paso UTEP (CAMS 12) monitoring site and caused ozone levels that were well outside the normal historical fluctuation of ozone values at the El Paso UTEP (CAMS 12) monitoring site. Second, the fire caused the day's maximum eight-hour ozone average concentration for June 21, 2015 to climb above the 2015 eight-hour ozone NAAQS. Using a weight of evidence approach, the TCEQ will show a causal relationship between the Hog fire and ozone concentrations measured at the El Paso UTEP (CAMS 12) monitoring site. The TCEQ will also demonstrate that this event affected air quality at the monitoring site by creating an exceedance of the 2015 ozone NAAQS and higher ozone concentrations than would have been experienced without the transported wildfire emissions.

2.6 THE EVENT IS NOT REASONABLY CONTROLLABLE OR PREVENTABLE

Having occurred outside of the State of Texas, these fires were not controllable or preventable by Texas.

2.7 THE EVENT IS NOT LIKELY TO RECUR OR IS NATURAL

The primary fire determined to have caused the subject ozone exceedance was ignited by a natural cause: lightning strike. Two of the additional fires (Kearney River and Saguaro) were caused by human activity. Once an area has been burned out, the likelihood of that area burning again declines for an extended period (assuming that the fire was completely extinguished), and the biomass available to burn is significantly reduced such that a fire in the same area in the next several years would likely yield significantly fewer emissions. Any of the fires attributable to

human causes that occur outside of Texas are not controllable or preventable by the State of Texas.

2.8 THE TCEQ FOLLOWED THE PUBLIC COMMENT PROCESS

The TCEQ provided for stakeholders and the public to comment on this document for 30 days as required by federal rules. All comments received will be included in the final version of this demonstration package.

2.9 MITIGATION REQUIREMENTS OF 40 CFR §51.930

The EER (40 CFR §51.930) requires that "a State requesting to exclude air quality data due to exceptional events must take appropriate and reasonable actions to protect public health from exceedances or violations of the national ambient air quality standards." The TCEQ addresses each of the specific requirements individually below.

2.9.1 Prompt Public Notification

The first mitigation requirement is to "provide for prompt public notification whenever air quality concentrations exceed or are expected to exceed an applicable ambient air quality standard." The TCEQ provided (and continues to provide) ozone, fine Particulate Matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and Particulate Matter less than or equal to 10 microns in diameter (PM_{10}) Air Quality Index (AQI) forecasts for the current day and the next three days for 14 areas in Texas including the El Paso area. These forecasts are available to the public on the Today's Texas Air Quality Forecast webpage of the TCEQ website (http://www.tceq.texas.gov/airquality/monops/forecast_today.html), and on the EPA's AirNow website (http://airnow.gov/). The TCEQ provides near real-time hourly ozone measurements from monitors across the state, including the El Paso area, which the public may access on the Current Ozone Levels page of the TCEQ website (http://www.tceq.texas.gov/cgi-bin/compliance/monops/select_curlev.pl). The TCEQ also publishes an AQI Report for a number of Texas metropolitan areas including the El Paso area on the AQI page of the TCEQ website (http://www.tceq.state.tx.us/cgi-bin/compliance/monops/aqi_rpt.pl), which displays current and historical daily AQI measurements. Finally, the TCEQ publishes daily updates to its air quality forecast to interested parties through electronic mail. Any person wishing to receive these updates may register on the TCEQ website (http://www.tceq.texas.gov/airquality/monops/ozone_email.html). These measures provide daily and near real-time notification to the public of current, expected, and changing air quality conditions.

2.9.2 Public Education

The second mitigation requirement is to "provide for public education concerning actions that individuals may take to reduce exposures to unhealthy levels of air quality during and following an exceptional event." Through its website, the TCEQ provides the public with technical, health, personal activity, planning, and legal information and resources concerning ozone pollution.

The TCEQ maintains an ozone fact sheet (http://www.tceq.texas.gov/airquality/monops/ozonefacts.html), which provides important information regarding the health effects of ozone, steps that individuals can take to limit ozone formation, and actions they may wish to take to reduce their exposure to higher levels of ozone. A hyperlink to this fact sheet is located on the TCEQ daily air quality forecast page. The fact sheet points individuals towards additional health-related information from the Centers for Disease Control, the Texas Department of State Health Services, and the EPA.

The TCEQ's main web page for air (http://www.tceq.texas.gov/agency/air_main.html) provides air quality information on topics such as advisory groups, emissions inventories, air quality modeling and data analysis, scientific field studies, state implementation plans (SIP), air permits, rules, air monitoring data, and how to file complaints.

The TCEQ provides a specific "Air Pollution from Ozone" web page (http://www.tceq.texas.gov/airquality/sip/criteria-pollutants/sip-ozone), which provides the latest information on air quality planning activities by both the TCEQ and the EPA.

The TCEQ's website provides a hyperlink to the Texas "AirNow" web site operated by the EPA (http://www.airnow.gov/index.cfm?action=airnow.local_state&stateid=45&tab=0). This web site links the public to additional information regarding health effects of ozone, strategies for reducing one's exposure to ozone, and actions that individuals can take to reduce pollution levels.

The Texas Department of Transportation sponsors the public education and awareness campaign, "Drive Clean Across Texas" (http://www.drivecleanacrosstexas.org). The campaign raises awareness about the impact of vehicle emissions on air quality and motivates drivers to take steps to reduce air pollution. The campaign's activities are concentrated during the summer months when ozone levels rise.

The TCEQ sponsors the "Take Care of Texas" program (http://takecareoftexas.org/air-quality), which addresses air quality and provides the public with proactive steps to reduce air pollution particularly on days when air quality forecasts are issued predicting greater potential for ozone formation.

2.9.3 Implementation of Measures to Protect Public Health

When dealing with exceptional events originating from outside of Texas (e.g., the case of June 15, 2015), there is very little that the TCEQ can do to mitigate the impact of additional ozone created by the exceptional event. The City of El Paso is nonattainment for PM_{10} and the TCEQ has adopted a SIP (TCEQ, 2012) to improve PM_{10} levels in the city. Because the El Paso area was previously an ozone and carbon monoxide nonattainment area, the TCEQ has implemented a maintenance plan approved by the EPA (TCEQ, 2006B). The maintenance plan includes measures such as a low Reid Vapor Pressure gasoline program, an inspection and maintenance program, the Texas Emissions Reduction Program, and 30 Texas Administrative Code Chapter 115 rules for the control of VOC emissions from stationary sources (TCEQ, 2006B), (TCEQ, 2006A), and (TCEQ, 2008). More detailed information about the state's ozone reduction strategies can be found on the following Web pages:

Control Strategies for Stationary Sources: http://www.tceq.texas.gov/airquality/stationary-rules/ozone

Control Strategies for On-Road Mobile Sources: http://www.tceq.texas.gov/airquality/mobilesource/mobile_source.html

Air Permitting: http://www.tceq.texas.gov/permitting/air

Texas Emissions Reduction Plan Program: http://www.tceq.texas.gov/airquality/terp/erig.html

2.10 A CLEAR CAUSAL RELATIONSHIP EXISTS

Scientific consensus exists that emissions from fires can increase ozone levels downwind of the fire area. The TCEQ provides ample scientific evidence of a causal relationship in this package. Using a combination of ground-based measurements, meteorological modeling, and satellite

imagery, the TCEQ will demonstrate that the Hog fire caused the measured exceedance on June 21, 2015. The analyses will clearly show that an ozone plume containing pollutants associated with fires passed through the area surrounding the El Paso UTEP (CAMS 12) monitoring site on June 21, 2015, and that the plume was transported from the Hog fire in Arizona.

2.11 IN EXCESS OF NORMAL HISTORICAL FLUCTUATIONS

Although the EPA has not precisely defined when a measured concentration is "in excess of normal historical fluctuations," the 77 ppb ozone average observed at the El Paso UTEP (CAMS 12) monitoring site on June 21, 2015, is clearly in excess of normal fluctuations. The daily maximum eight-hour ozone concentration measured on June 21, 2015, exceeds the 99th percentile of data from the seven-month ozone season in El Paso over a six-year period. The same day's maximum eight-hour ozone average concentration also exceeds the 99th percentile of data on a 12 month basis over the same six-year period. (See Figure 3-3: *Percent Rank of June 21, 2015, based on Year-round Data* and Figure 3-4: *Percent Rank of June 21, 2015, based on Ozone Season Data*)

2.12 THERE WOULD HAVE BEEN NO EXCEEDANCE BUT FOR THE EVENT

Using a surrogate day analysis, the TCEQ will show that without the transported emissions of the Hog fire in Arizona, the exceedance of June 21, 2015, would not have occurred. The surrogate day analysis compares June 26, 2011, to June 21, 2015. These two days are very similar except for the presence of significant transported fire emissions on June 21, 2015. The lack of an exceedance on a day that is very similar to June 21, 2015, in terms of meteorology and local emissions provides compelling evidence that without emissions from the fires an ozone exceedance would not have occurred.

CHAPTER 3: THE EXCEEDANCE OF JUNE 21, 2015

3.1 PERIOD OF ANALYSIS

When considering the amount of data that should be included in a technical demonstration, the Environmental Protection Agency (EPA) (2013, p. 5) notes that "For seasonal comparisons, the EPA recommends using all available seasonal data from 3-5 years (or more, if available)." For this exceptional event demonstration, the TCEQ has chosen to use a six-year period running from 2010 through 2015. The TCEQ did not use data from 2016 because this year is not yet complete. Avoiding the use of partial years or ozone seasons prevents a partial year or season from introducing a bias into the analysis results. From 2008 through 2010, El Paso's ozone design value dropped from 78 parts per billion (ppb) to 71 ppb (See Figure 1-1: *El Paso Area Annual Ozone Design Value 2000-2015*). This rapid drop in design value indicates a significant change in El Paso's air quality. It also signals that data from years prior to 2010 come from a period of time that is very different from El Paso's current air quality situation. That data would not be representative of the context in which the events of June 21, 2015, occurred. In short, using earlier data would introduce a bias into analytical results obtained by the TCEQ and, therefore, it would be scientifically indefensible to do so.

All ground monitoring data used in this demonstration package was obtained from the Texas Air Monitoring Information System (TAMIS).

3.2 THE RELATIONSHIP OF OZONE AND $PM_{2.5}$

In a previous ozone exceptional event demonstration, the TCEQ submitted a chart depicting co-located measurements of ozone and Fine Particulate Matter ($PM_{2.5}$) that rose and fell together over the course of several hours. The EPA commented on this information, noting that:

> "The package shows hourly $PM_{2.5}$ and ozone concentrations rising at the same time (Figure 4-4), but does not contrast this behavior with a day that is not believed to be impacted by fire events. The coincident timing of the $PM_{2.5}$ and ozone is not an unusual result because under stagnant conditions both pollutants should rise at the same time." (EPA, September 18, 2015, p. 4).

In preparing this demonstration, the TCEQ reviewed all 31 exceedance days at the El Paso UTEP (CAMS 12) monitoring site that occurred during 2010 through 2015. On a typical day, the diurnal profiles of ozone and $PM_{2.5}$ are almost mirror images of one another (see Figure 3-1: *El Paso UTEP (CAMS 12) Average Ozone and PM2.5 Diurnal Profiles*). When ozone is increasing in mid-day, $PM_{2.5}$ is usually decreasing and when $PM_{2.5}$ is increasing during the morning and afternoon traffic periods ozone is usually decreasing. On ozone exceedance days the meteorology is, by definition, ozone-conducive. Given EPA's statement, one would expect that $PM_{2.5}$ would break with the usual pattern and rise and fall with ozone (especially when winds were light). Time after time, however, $PM_{2.5}$ and ozone maintained their mirror image relationship, and $PM_{2.5}$ measurements tended to follow their normal diurnal pattern. On June 21, 2015, $PM_{2.5}$ rose and fell with ozone at a time of the day when $PM_{2.5}$ is normally decreasing (one of only three cases where this happens on an exceedance day). In five additional cases, $PM_{2.5}$ measurements deviated from their typical diurnal profile without following ozone closely. Therefore, the TCEQ concludes that, for the UTEP monitor on a high-ozone day, co-located measurements of ozone and $PM_{2.5}$ rising and falling together can be evidence that supports a clear causal relationship between fires and increased ozone. See *Appendix A: A Review of El Paso UTEP (CAMS 12) Monitoring Site Exceedance Days*, for $PM_{2.5}$, ozone, and average wind speed measurements for the exceedance days reviewed.

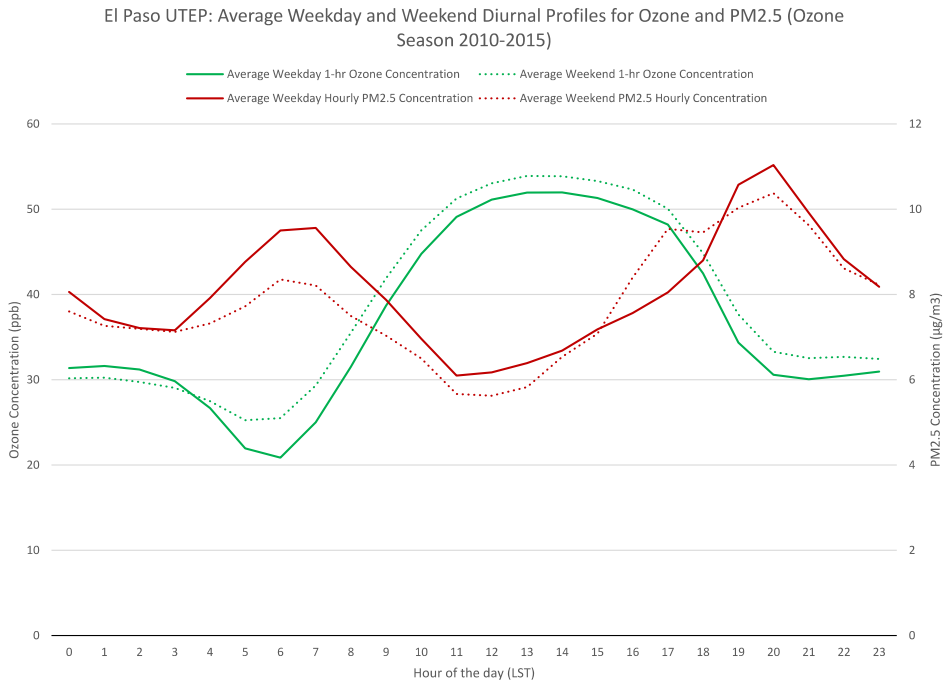

Figure 3-1: El Paso UTEP (CAMS 12) Average Ozone and $PM_{2.5}$ Diurnal Profiles

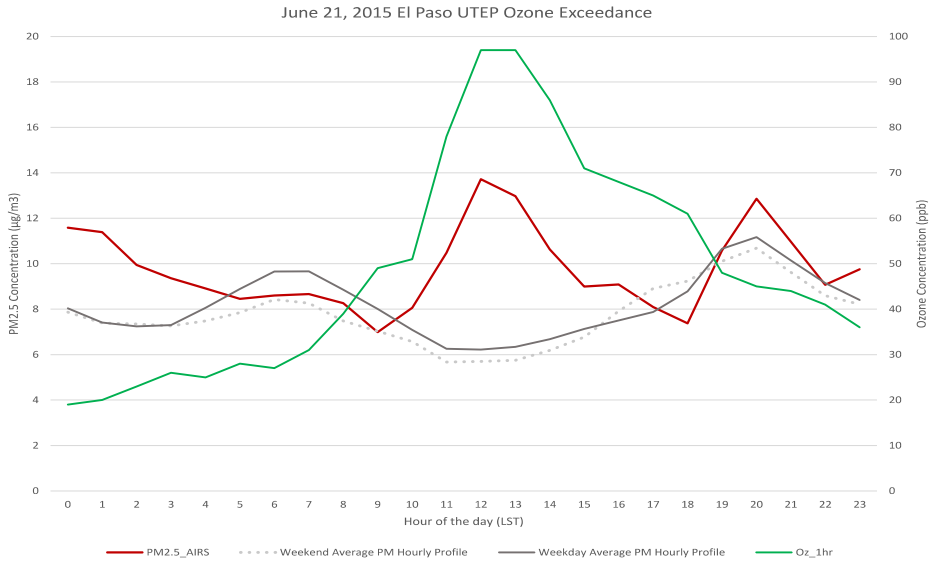

Figure 3-2: Ozone and $PM_{2.5}$ Measurements at El Paso UTEP on June 21, 2015

While the presence of elevated $PM_{2.5}$ measurements that correspond to rising and falling ozone measurements are consistent with the ozone and $PM_{2.5}$ having a common origin, it should be remembered that it is ultimately not $PM_{2.5}$ but other wildfire emissions and their reaction products that determine ozone production in a plume. Recent studies (Jaffe et. al., 2013) (Widger et. al., 2013) of the impact of wildfires on ozone concluded that ozone and Particulate Matter (PM) enhancements from wildfires show little relationship. This situation is likely to arise out of ozone's complex chemistry (Jaffe et. al., 2013). This means that ozone levels in a

wildfire plume may be enhanced even though visible indicators of fire, such as smoke, are not visible.

3.3 REGULATORY IMPORTANCE

The Hog Fire event has regulatory importance because the EPA's concurrence with this demonstration would prevent the El Paso area from being designated under the 2015 eight-hour ozone NAAQS. As of September 26, 2016, the 2016 El Paso UTEP (CAMS 12) (and the El Paso area's) ozone design value stands at 71 ppb. If the EPA concurs with this demonstration then the El Paso area 2016 ozone design value would drop to 70 ppb. Table 3-1: *El Paso Area Ozone Design Value Comparison*, shows the comparison between approval and non-approval of the exceptional event day.

Table 3-1: El Paso Area Ozone Design Value Comparison

	2014	2015	2016
First High	75 ppb	81 ppb	78 ppb
Second High	73 ppb	77 ppb	78 ppb
Third High	72 ppb	74 ppb	72 ppb
Fourth High	70 ppb	72 ppb	71 ppb
Fifth High	69 ppb	70 ppb	69 ppb
Ozone DV without Exceptional Event excluded	71 ppb		
Ozone DV with Exceptional Event excluded	70 ppb		

3.4 CAUSE OF THE HOG FIRE IN ARIZONA

According to the National Wildfire Coordination Group (http://inciweb.nwcg.gov/incident/4303/) the Hog fire started on June 17, 2015, and was caused by a natural event, namely, a lightning strike. Because the fire occurred outside of Texas, the State of Texas had no ability to prevent or control the fire.

3.5 THE EVENT WAS NOT REASONABLY CONTROLLABLE OR PREVENTABLE

Because the fire occurred outside of Texas, and was caused by a natural event, the State of Texas had no ability to prevent or control the Hog fire.

3.6 THE EVENT WAS IN EXCESS OF NORMAL HISTORICAL FLUCTUATIONS

The maximum daily eight-hour ozone average concentration of 77 ppb measured at the El Paso UTEP (CAMS 12) monitoring site was truly outside of normal historical fluctuations. Figure 3-3:

Percent Rank of June 21, 2015, based on Year-round Data and Figure 3-4: *Percent Rank of June 21, 2015, based on Ozone Season Data* both provide evidence that the El Paso UTEP (CAMS 12) monitoring site sees levels of 77 ppb very infrequently. In fact on both an annual and seasonal basis, June 21, 2015, ranks above the 99th percentile.

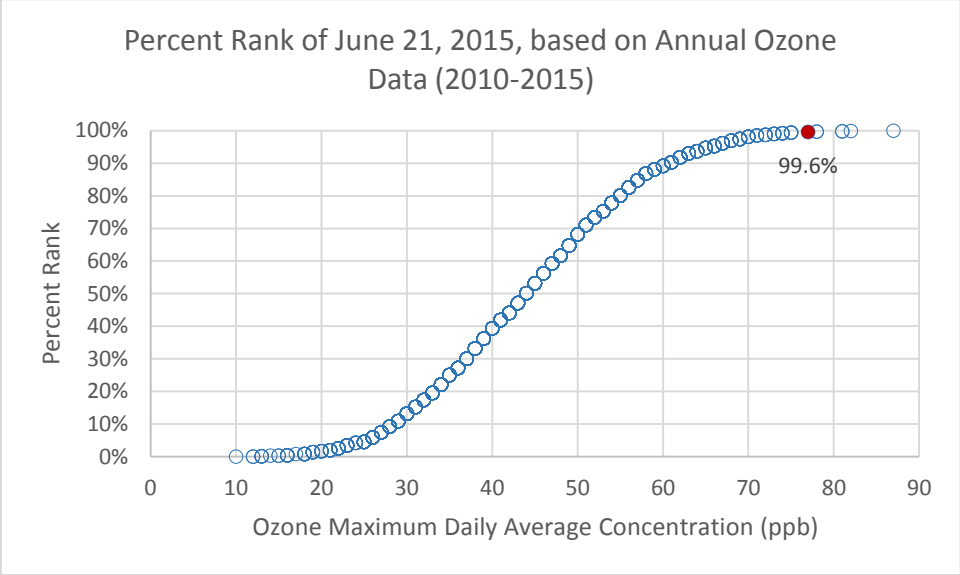

Figure 3-3: Percent Rank of June 21, 2015, based on Year-round Data

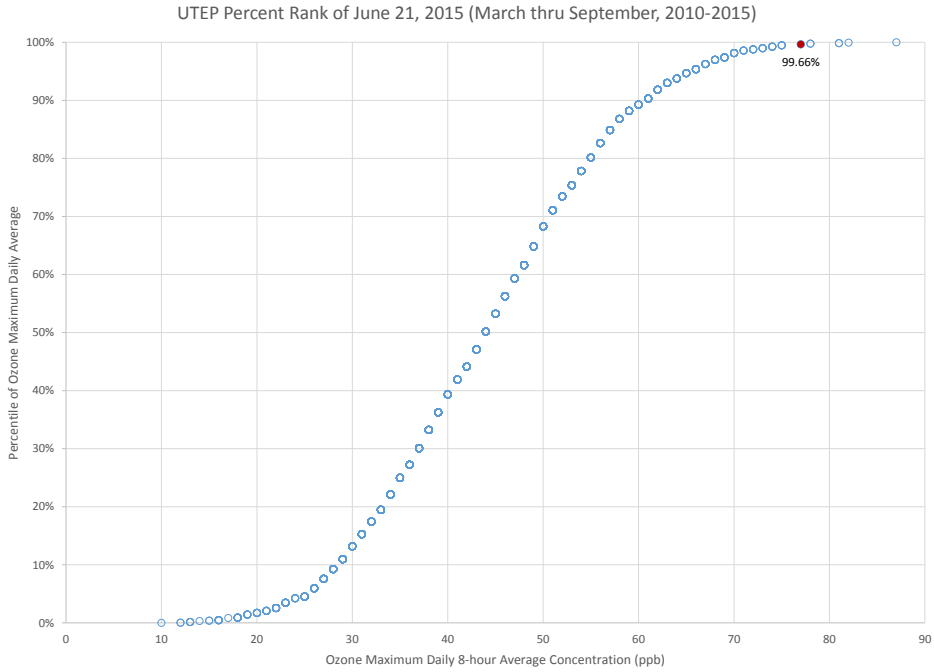

Figure 3-4: Percent Rank of June 21, 2015, based on Ozone Season Data

Although the El Paso UTEP (CAMS 12) monitoring site may, on rare occasions, see maximum ozone daily eight-hour averages of 77 ppb on days not significantly influenced by fires, the applicable EER requirement is for the state to demonstrate that the value is in excess of *normal* historical fluctuation. An average in the top 0.4 percent of maximum daily eight-hour ozone averages is certainly not normal or routine. Moreover, EPA's recently released

Exceptional Events Final Rule states that "The Administrator shall not require an air agency to prove a specific percentile point in the distribution of data" (40 CFR 50.14(c)(3)(iv)(C)). The TCEQ agrees with this revision as well as the recent EPA statement that "Air agencies should not be held accountable for exceedances due to exceptional events" (EPA, November 10, 2015). The practice of not holding states responsible for events outside their control is important and consistent with the EPA's EER.

3.7 A CLEAR CAUSAL RELATIONSHIP EXISTS AND AFFECTS AIR QUALITY

The EPA draft guidance states that, "Because plume elevation is not directly available from simple imagery, plume imagery alone does not conclusively show that fire emissions transported aloft reached a ground-level monitor. If plume arrival at a given location coincides with elevation of fire plume components (such as $PM_{2.5}$, CO or organic and elemental carbon), those two pieces of evidence combined can show that smoke was transported to the event location" (U.S. EPA, November 10, 2015, pp. 21-22).

Co-located measurements of ozone and $PM_{2.5}$ at the El Paso UTEP (CAMS 12) monitoring site clearly show that an ozone plume, accompanied by high levels of $PM_{2.5}$, consistent with wildfire emissions, passed over the El Paso UTEP (CAMS 12) monitoring site beginning at 11:00 AM (LST) of June 21, 2015. Figure 3-2: *Ozone and PM2.5 Measurements at El Paso UTEP on June 21, 2015*, shows the tight correspondence between the two pollutants and the significant deviation of $PM_{2.5}$ from its average diurnal pattern. As the EPA guidance quoted above indicates, this is a clear indication that the ozone plume originated from wildfire emissions. Also, as noted in Section 3.2: *The Relationship of Ozone and $PM_{2.5}$*, this relationship does not arise because the meteorology on June 21, 2015, was conducive to high levels of ozone and $PM_{2.5}$.

The ozone plume that impacted the El Paso UTEP (CAMS 12) monitoring site was also observed at the El Paso Chamizal (CAMS 41) monitoring site, which observed high levels of carbon monoxide (CO) to be present with the ozone (also consistent with a plume that originated from wildfire emissions). The El Paso Chamizal (CAMS 41) monitoring site is 2.5 miles from the El Paso UTEP (CAMS 12) monitoring site. Like $PM_{2.5}$ at the El Paso UTEP (CAMS 12) monitoring site, CO measurements at the El Paso Chamizal (CAMS 41) monitoring site deviate from a typical diurnal pattern when the plume from the Hog fire appears in El Paso. Figure 3-5: *El Paso Chamizal (CAMS 41) CO and Ozone* , clearly shows that CO peaks at the same time as ozone when it would normally be at the bottom of a trough.

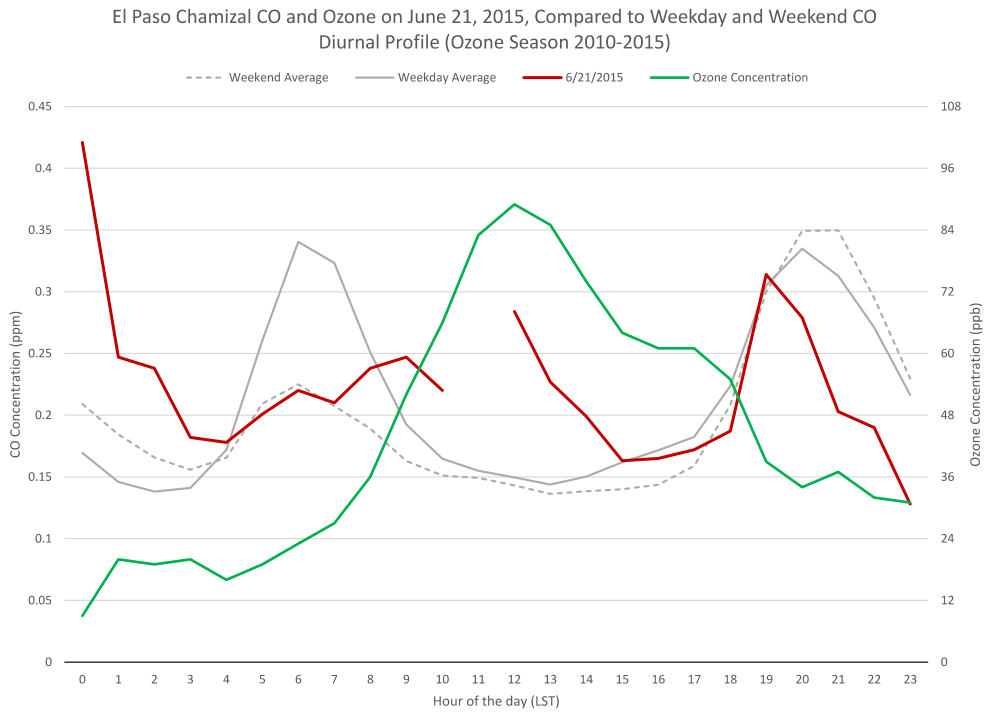

Figure 3-5: El Paso Chamizal (CAMS 41) CO and Ozone Measurements[2]

Figure 3-6: *MODIS Imagery (Aqua Satellite) of AOD over El Paso on June 21, 2015*, shows a measurement of Aerosol Optical Depth (AOD) taken on the afternoon of June 21, 2015. AOD "indicates the level at which particles in the air (aerosols) prevent light from traveling through the atmosphere. Aerosols absorb and scatter incoming sunlight, which reduces visibility and increases the optical depth. An optical depth of less than 0.1 indicates a clear sky with maximum visibility, and a value of 1 indicates the presence of aerosols so dense that people would have difficulty seeing the sun." A value of 0.4 indicates that El Paso is experiencing an elevated level of aerosol in its atmosphere (NASA Worldview, http://go.nasa.gov/2bogMqv, July 18, 2016).

Figure 3-7: *AIRS Imagery (Aqua Satellite) of CO Over El Paso on June 21, 2015*, shows a daytime total column measurement of CO at 80-90 ppb over the El Paso area June 21, 2015 (NASA Worldview, http://go.nasa.gov/2bohdB9, July 18, 2016). The combination of satellite imagery and ground-based measurements shows (according to EPA guidance) that the pollutants not only reached the El Paso area, but also mixed down to ground level.

[2] Note that the Chamizal CO monitoring equipment was not operational between 10:00 AM and 12:00 PM on June 21, 2015.

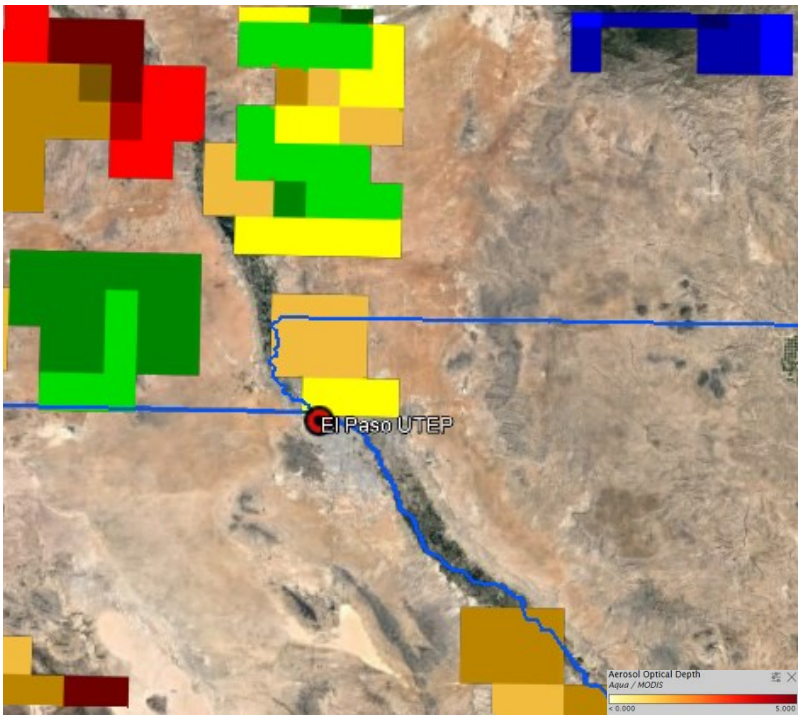

Figure 3-6: MODIS Imagery (Aqua Satellite) of AOD over El Paso on June 21, 2015

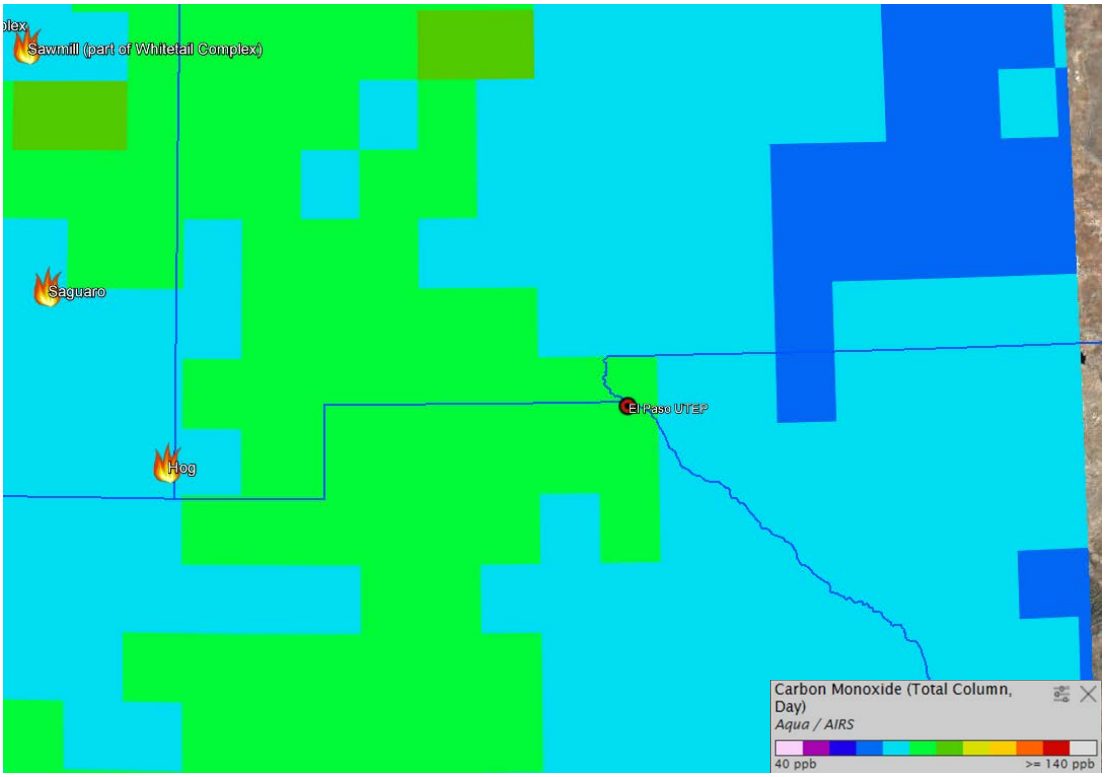

Figure 3-7: AIRS Imagery (Aqua Satellite) of CO Over El Paso on June 21, 2015

Air parcel trajectories created by the Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) Model (Stein *et. al.*, 2015), developed by scientists at the National Oceanic and Atmospheric Administration (NOAA), were evaluated to determine if emissions from the fires were transported to El Paso at the time of the elevated ozone measurements. For the purposes of this demonstration the TCEQ chose to use North American Regional Reanalysis (NARR) input meteorological data sets. These data sets are newer than the more traditional North American Mesoscale Forecast System (NAM) (Eta) Data Assimilation System (EDAS) data sets with a resolution of 40 kilometers that are provided by the National Centers for Environmental Prediction (NCEP). NARR data sets are available at the HYSPLIT web page for gridded meteorological data archives (http://www.ready.noaa.gov/archives.php). NARR meteorological data is a consistent set of data from 1979 to the present. "The data is available on a 3 hourly, 32 km grid. The NARR project is an extension of the NCEP Global Reanalysis effort which is run over the North American Region. The NARR model uses the very high resolution NCEP Eta Model (32km/45 layer) together with the Regional Data Assimilation System (RDAS) which, significantly, assimilates precipitation along with other variables. The improvements in the model/assimilation have resulted in a dataset with substantial improvements in the accuracy of temperature, winds and precipitation compared to the NCEP-DOE Global Reanalysis 2." (http://www.ready.noaa.gov/data/archives/narr/README.TXT).

The Global Reanalysis project is a joint project between NCEP and the National Center for Atmospheric Research (NCAR). The project's purpose is to create new atmospheric analyses based on historical data (1948 and later) and produce analyses of current atmospheric conditions. Usually, analysts have had to rely on data sets that supported real-time weather forecasting. Improvements in data assimilation systems over time have created inconsistencies between these real-time weather forecasting data sets. Reanalysis data sets should have greater quality and utility than real-time weather forecasting data sets because:

- they are produced using modern, consistent data assimilation methodologies;
- they are based on more observations;
- they are evaluated with improved quality control measures;
- they contain additional variables;
- they are global; and
- they have better vertical resolution. (http://www.ready.noaa.gov/gbl_reanalysis.php)

Other important HYSPLIT parameters chosen by the TCEQ for its HYSPLIT analysis are provided in *Table 3-2: HYSPLIT Parameters Chosen by the TCEQ*, below.

Table 3-2: HYSPLIT Parameters Chosen by the TCEQ

Parameter	Value
Modeling Parameters	
Model Version	802 (February 2016)

Input Meteorological Data Set	NARR201506
Vertical Motion Method	0 = input model data (default)
Top of model	10,000 meters AGL (default)
Display Options	
Map Projection	Auto (default)
GIS Out	Google Earth
Label Source	On
Time Label Interval	3 hours
Vertical Coordinate	Meters AGL
Zoom:	30%

As with all meteorological models, the HYSPLIT trajectory model has known errors. NOAA's ARL identifies four sources of error for HYSPLIT trajectories:

- physical error due to inadequacies of the data's representation of the atmosphere in space and time;
- computational error due to numerical inaccuracies of the computer
- measurement errors in creating the model's meteorological data fields; and
- forecast errors if the model uses forecast meteorology.

By using reanalysis data, NARR data sets eliminate the forecast error component. Computational errors can be analyzed through various experiments with backwards and forwards trajectories, but physical errors (related to how well the numerical information estimates the true atmosphere) cannot be estimated without independent verification data which is not available for this demonstration. "Overall, from the literature, one can estimate the total error to be anywhere from 15 to 30% of the travel distance." (http://www.arl.noaa.gov/documents/workshop/NAQC2007/HTML_Docs/trajerro.html)

Estimating a reasonable margin of error for HYSPLIT trajectories is important. The EPA's recently approved guidance for preparing exceptional event demonstrations for wildfire events (EPA, 2016) notes in Appendix A.3 that "Uncertainties are clearly present in these results, and these uncertainties can be thought to be a range on either side of the center line in which the air parcel may be found. Further back in time along the trajectory path, that range may be assumed to increase. In other words, one should avoid concluding a region is not along a trajectory's path if that trajectory missed the region by a relatively small distance."

While the distance traveled by each trajectory is different, one can arrive at a conservative estimate of a reasonable margin of error by using the map distance from the Hog Fire to the El Paso UTEP (CAMS 12) monitoring site. The map distance between these two points is approximately 248 km and represents the smallest possible travel distance from the Hog Fire to the El Paso UTEP (CAMS 12) monitoring site. If NOAA's estimate of total error is accurate, then a map distance of 248 km means a typical error of between 37.2 km at 15 percent of travel distance to 74.4 km at 30 percent of travel distance. For the purposes of this demonstration, the TCEQ has chosen to use 55.8 km, or 22.5 percent of travel distance as a reasonable minimum margin of error. If a trajectory passes within 55.8 km of the Hog Fire or El Paso UTEP (CAMS 12) monitoring site one should avoid concluding that the area is not along a trajectory's path if that trajectory missed the area by a relatively small margin.

The TCEQ generated 18-hour backwards trajectories from the El Paso UTEP (CAMS 12) monitoring site at heights of 100, 200, 300, and 400 meters (m) above ground level for every hour of the eight hours of the 11:00 to 18:00 (LST) averaging period plus similar trajectories for 12:30 and 13:30 PM (LST) (to represent the two peak hours of ozone measurements). The trajectories for the 11:00 AM through 16:00 PM (LST) hours consistently pass within 22.5 percent of travel distance of the Hog fire location at heights between 250 and 450 m above ground level. The low level at which the trajectories pass over the fire area make entrainment of wildfire emissions a near certainty. Figure 3-8: *El Paso UTEP (CAMS 12) Back Trajectories for 1:30 PM (LST)*, shows a typical example of back trajectories originating at the El Paso UTEP (CAMS 12) monitoring site and passing very close to the Hog fire on June 21, 2015. *Appendix B: El Paso UTEP HYSPLIT Back Trajectories*, contains additional (and larger) images of the back trajectories discussed here.

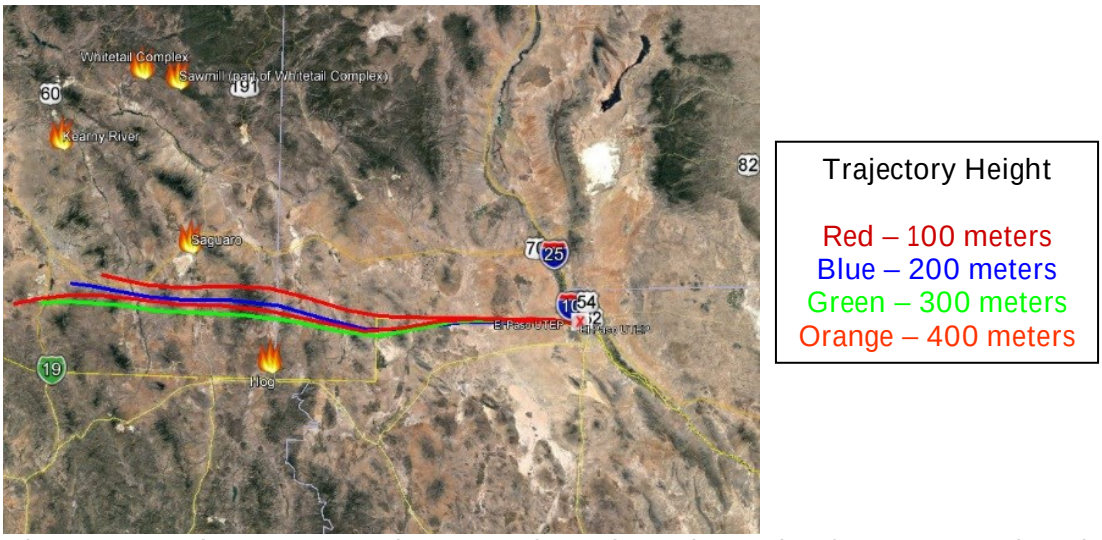

Figure 3-8: El Paso UTEP (CAMS 12) Back Trajectories for 1:30 PM (LST)

The TCEQ also generated forward HYSPLIT trajectories from the Hog fire (100, 200, 300, and 400 meters above ground level) that were 14 hours in length. The trajectories were run hourly beginning with the 11:00 PM (MST) hour on June 20, 2015, through the 10:00 AM (MST) hour on June 21, 2015. Until the last 7:00 AM (MST) hour these forward trajectories consistently travel over the El Paso area with one or more trajectories arriving at elevations ranging from less than 100 m to 500 m above ground level. These low altitudes over the El Paso UTEP (CAMS 12) monitoring site provide compelling evidence that the wildfire emissions mixed all the way down to the monitoring site and affected air quality. Figure 3-9: *Forward Trajectories from the Hog*

fire Arriving at the El Paso UTEP (CAMS 12) Site, provides an excellent example of how close emissions from the Hog fire came to the El Paso UTEP (CAMS 12) monitoring site. *Appendix C: Hog Fire HYSPLIT Forward Trajectories*, contains additional (and larger) images of the back trajectories discussed here.

Figure 3-9: Forward Trajectories from the Hog fire Arriving at the El Paso UTEP (CAMS 12) Site

It is also likely that several other fires in Arizona contributed to the high ozone measurements at the El Paso UTEP (CAMS 12) monitoring site. Low level (200 meter above ground) forward trajectories (24 hours in length) also arrive in the El Paso area from Saguaro, Kearny River, Sawmill, and Whitetail Complex Fires. These trajectories were initiated at 11:00 AM (LST) and 12:00 PM (LST) on June 20, 2015 and arrive in the El Paso area just as the eight-hour averaging period is beginning on June 21, 2015. The elevation of these trajectories over the El Paso area ranged from 900m to 1000 m. Figure 3-10: *June 20, 2015, 11:00 AM (LST) Forward Trajectories from Arizona Fires*, and Figure 3-11: *June 20, 2015, 12:00 PM (LST) Forward Trajectories from Arizona Fires*, show these trajectories reaching the El Paso area.

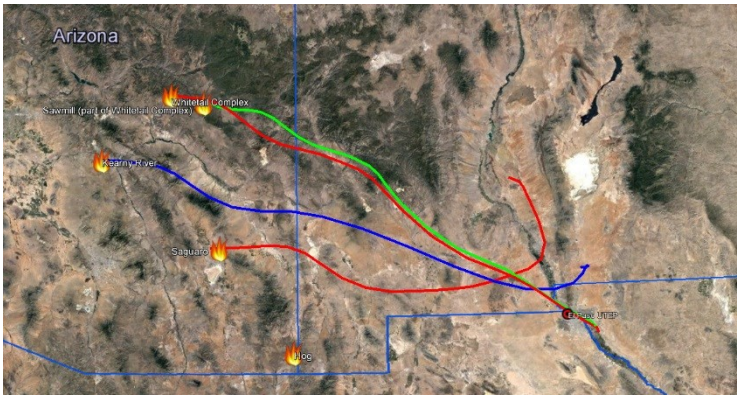

Figure 3-10: June 20, 2015, 11:00 AM (LST) Forward Trajectories from Arizona Fires

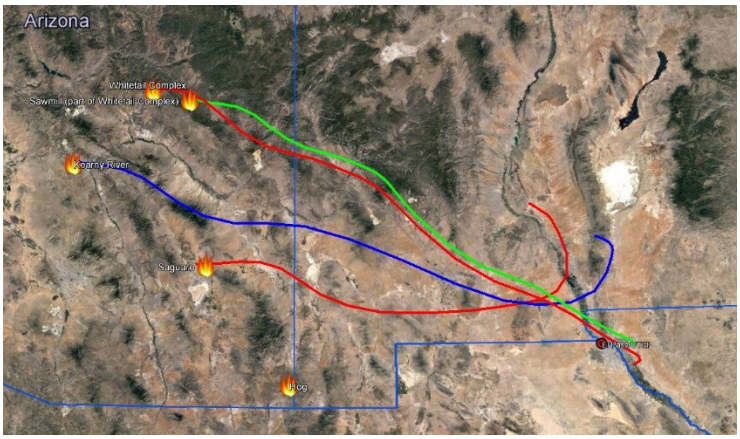

Figure 3-11: June 20, 2015, 12:00 PM (LST) Forward Trajectories from Arizona Fires

As part of its monitoring program in El Paso, the TCEQ maintains cameras at several locations around the El Paso area. One of these cameras is located on top of Ranger Peak, a mountain peak located at the Franklin Mountain's southern end in northern El Paso. From its viewpoint looking south into Ciudad Juarez, it documented the presence of noticeable haze consistent with wildfire smoke over El Paso at mid-day of June 21, 2015. *Figure 3-12: Ranger Peak Camera 1:47 PM, June 18, 2015*, shows a clear image from Ranger Peak on June 18, 2015. In this image the mountains indicated by the red arrow are clearly visible. The next image, *Figure 3-13: Ranger Peak Camera 1:46 PM, June 21, 2015*, shows the same point of view on June 21, 2015 where the same mountains are almost entirely obscured by haze. The third Ranger Peak image, *Figure 3-14: Ranger Peak Camera 1:47 PM, August 10, 2015*, shows the same point of view on August 10, 2015, when the El Paso UTEP (CAMS 12) monitoring site recorded a maximum daily eight-hour ozone average of 74 ppb. The image from August 10, 2015, indicates that ozone exceedances can occur in El Paso without generating significant amounts of haze. This increases the likelihood that the haze experienced by El Paso on June 21, 2015, was associated with wildfire smoke. *Appendix D. Ranger Peak Camera Imagery,* contains larger versions of the images shown here as well as a more complete set of days immediately before and after June 21, 2015. The appendix also contains imagery comparable imagery from the other 2015 ozone exceedance days at the El Paso UTEP (CAMS 12) monitoring site.

Figure 3-12: Ranger Peak Camera 1:47 PM, June 18, 2015

Figure 3-13: Ranger Peak Camera 1:46 PM, June 21, 2015

Figure 3-14: Ranger Peak Camera 1:47 PM, August 10, 2015

The TCEQ also analyzed NO and NO_2 measurements taken at the El Paso UTEP (CAMS 12) and El Paso Chamizal on June 21, 2015. The data is presented in *Table 3-3: NO and NO2 Measurements at El Paso UTEP and Chamizal*. Hourly measurements show that NO_X at both sites was dominated by NO_2 throughout the day. The NO_2 percentage of NO_X (NO_X = NO + NO_2) was not calculated for hours where either NO or NO_2 measurements were less than zero or missing. Nonetheless, the smallest NO_2 percentage measured at El Paso Chamizal (CAMS 41) all day was 74.2%. NO_2 percentages were only calculated for six hours at El Paso UTEP (CAMS 12), but the smallest NO_2 percentage measured was 77.1%. NO measurements at El Paso UTEP (CAMS 12) were very close to zero for a large majority of the day. Such high levels of NO_2 relative to NO indicates that the NO_X measured at the two monitoring sites that day was transported from outside the El Paso-Ciudad Juarez area rather than having come from local sources. The high fractions of NO_2 also indicate that little ozone production occurred at the monitoring sites that day.

Table 3-3: NO and NO_2 Measurements at El Paso UTEP and Chamizal

Time (LST)	El Paso UTEP (CAMS 12) June 21, 2015			El Paso Chamizal (CAMS 41) June 21, 2015		
	NO (ppb)	NO_2 (ppb)	NO_2 Fraction of NO_X	NO (ppb)	NO_2 (ppb)	NO_2 Fraction of NO_X
12:00 AM				2.13		
01:00 AM				0.12		
02:00 AM	0.55	10.22	94.9%	0.40	13.09	97.0%
03:00 AM	-0.24	7.30			12.30	
04:00 AM	-0.55	7.00		0.33	14.21	97.8%

05:00 AM	-0.62	4.32		1.31	12.64	90.6%
06:00 AM	1.12	6.72	85.7%	2.75	11.09	80.1%
07:00 AM	1.00	5.48	84.6%	3.43	9.85	74.2%
08:00 AM	0.79	6.34	88.9%	2.77	10.38	78.9%
09:00 AM	0.36	7.38	95.3%	1.63	10.53	86.6%
10:00 AM	3.10	10.44	77.1%	0.65	7.95	92.4%
11:00 AM	-0.95	2.52		0.76	8.42	91.7%
12:00 PM	-1.04	1.99		0.59	8.09	93.2%
01:00 PM	-0.97	1.38		0.56	7.68	93.3%
02:00 PM	-0.95	0.31		0.70	6.12	89.7%
03:00 PM	-1.14	-0.91		0.54	4.30	88.8%
04:00 PM	-0.96	-1.13		0.70	4.61	86.8%
05:00 PM	-0.80	-0.22		0.52	4.47	89.6%
06:00 PM	-0.86	0.90		0.51	6.38	92.6%
07:00 PM	-0.56	9.59		1.41	17.01	92.4%
08:00 PM	-0.19	2.59		2.10	15.79	88.3%
09:00 PM	-0.32	0.41		0.75	9.33	92.6%
10:00 PM	-0.31	0.01		0.73	9.59	92.9%
11:00 PM	-0.48	0.23		0.23	6.61	96.7%

The TCEQ also analyzed volatile organic compound (VOC) measurements taken by an automated gas chromatograph at the El Paso Chamizal (CAMS 41) monitoring site on June 21, 2015, and compared them to average diurnal profiles for the top ten most abundant (on average) VOC species during the 2010-2015 ozone seasons as shown in *Table 3-4: El Paso Chamizal VOC Measurements on June 21, 2015*. The most common VOCs in El Paso are broadly consistent of an urban area where VOC emissions are dominated by mobile sources, use of natural and liquid petroleum gas, and some oil refining. The average diurnal profile for these VOC species in El Paso is characterized by a morning peak occurring about 6:00 AM (LST) to 8:00 AM (LST)

followed by a trough through much of the afternoon followed by a second peak occurring from 8:00 PM (LST) to 10:00 PM (LST). Weekday diurnal profiles often have a morning peak that is greater than the weekend morning peak and an evening peak that is slightly lower than the weekend evening peak.

Table 3-4: El Paso Chamizal VOC Measurements on June 21, 2015

Species <AQS Code>	VOC Group	Ozone Season Mean (ppbC)	June 21, 2015 Diurnal Profile
Total NMOC <43102>		66.13	Mid-day peak 29.86 ppbC above mean
Propane <43204>	Alkane	10.49	Mid-day peak 2.70 ppbC above mean
Ethane <43202>	Alkane	10.11	Typical diurnal profile
n-Butane <43212>	Alkane	5.76	Mid-day peak 6.78 ppbC above mean
Isopentane <43221>	Alkane	5.14	Mid-day peak 6.40 ppbC above mean
Toluene <45202>	Aromatic	4.83	Typical diurnal profile
n-Pentane <43220>	Alkane	2.84	Mid-day peak 1.87 ppbC above mean
m/p Xylene <45109>	Aromatic	1.93	Typical diurnal profile
Isobutane <43214>	Alkane	1.84	Mid-day peak 1.27 ppbC above mean
Ethylene <43203>	Alkene	1.80	Mid-day peak 0.28 ppbC above mean
Propylene <43205>	Alkene	1.23	Mid-day peak 0.08 ppbC above mean

The TCEQ's analysis shows that total non-methane organic compounds (TNMOC) and most of the top ten VOC species experienced a daytime peak in their measurements that was not characteristic of their diurnal profiles. This provides further evidence that El Paso was experiencing an unusual event on June 21, 2015.

3.8 THERE WOULD HAVE BEEN NO EXCEEDANCE BUT FOR THE HOG FIRE

High pressure aloft centered over Arizona and New Mexico dominated the El Paso area on June 21, 2015. This high pressure resulted in abundant sunshine, temperatures over 100 degrees Fahrenheit and light winds. An inverted trough remained to the north and west of the area. Surface winds during the day were from the south-southeast as seen in the three-hour surface level back trajectory in Figure 3-15: *June 21, 2015, Three-hour Surface Back Trajectory from El Paso UTEP*. Figure 3-16: *Midday surface analysis for June 21, 2015*, shows the surface weather features on June 21, 2015.

Figure 3-15: June 21, 2015, Three-hour Surface Back Trajectory from El Paso UTEP

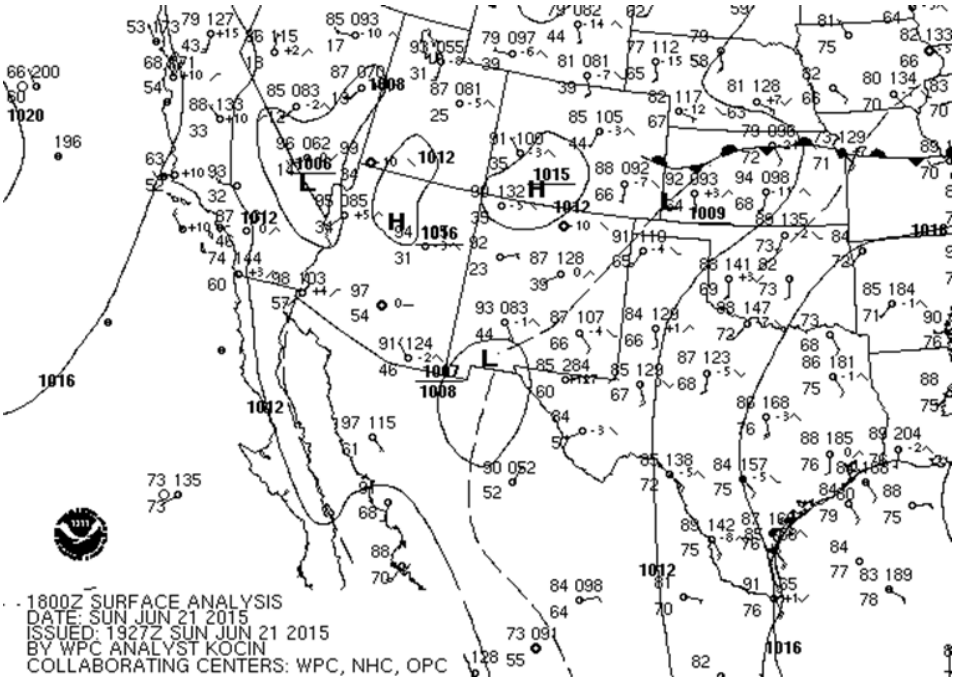

Figure 3-16: Midday surface analysis for June 21, 2015

Similar weather was present on June 26, 2011. High pressure aloft centered over the area resulted in subsidence and light winds in El Paso. The daily maximum temperatures in El Paso were above 100 degrees Fahrenheit. Figure 3-17: *June 26, 2011, Three-hour Back Trajectory from El Paso UTEP*, shows the three-hour surface back trajectory from the El Paso UTEP monitoring site on June 26, 2011. This shows a similar flow when compared to June 21, 2015 with surface winds coming from the south-southeast. The surface weather features on June 26, 2011, are shown in Figure 3-18: *Midday Surface Analysis for June 26, 2011*.

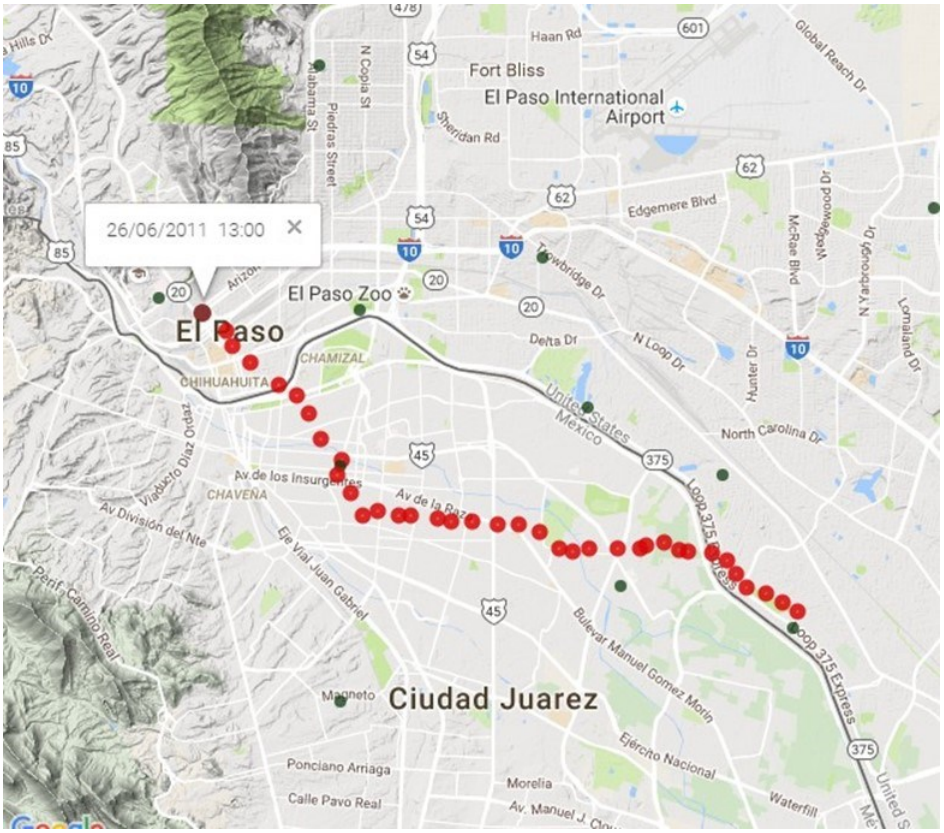

Figure 3-17: June 26, 2011, Three-hour Back Trajectory from El Paso UTEP

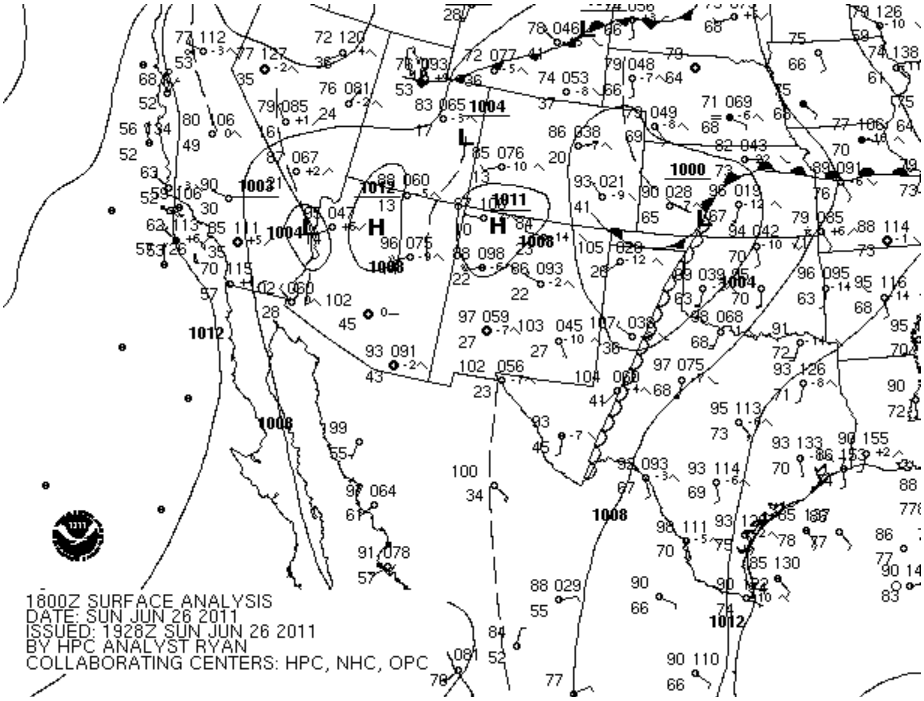

Figure 3-18: Midday Surface Analysis for June 26, 2011

Table 3-5: Surrogate Day Comparison

Parameter	June 21, 2015	June 26, 2011
Maximum Daily Eight-hour Ozone	77 ppb	70 ppb
Peak One-hour Ozone	97 ppb	79 ppb
Average Temperature*	99.4 °F	103.2 °F
Maximum Temperature	101.3 °F	104.7 °F
Maximum Solar Radiation	1.48 ly/min	1.37 ly/min
Average Wind Speed*	3.56 mph	5.78 mph
Average Relative Humidity*	9.2%	5.8%
Precipitation	0.00 in	0.00 in

*Parameters were averaged between 11:00 and 18:00 LST

Table 3-5: *Surrogate Day Comparison*, shows other ways in which June 21, 2015, and June 26, 2011, are very similar meteorologically. The primary difference between June 21, 2015, and June 26, 2011, is the existence of a plume associated with wildfire emissions on June 21, 2015. The surrogate day analysis suggests the 7 ppb ozone was unaccounted for under similar conditions and this could be attributed to wildfire emissions. It is likely that no exceedance would have occurred without the Hog fire.

3.9 CONCLUSION

The ambient monitoring evidence available from the El Paso UTEP (CAMS 12) and El Paso Chamizal (CAMS 41) monitoring sites clearly show the arrival and departure of an ozone plume on the afternoon of June 21, 2015. Furthermore, this plume included excessive amounts of $PM_{2.5}$ and CO pollutants, which are frequently associated with wildfire emissions. Satellite imagery taken from NASA's Worldview website confirms elevated levels of aerosol and CO that day. Taken together, these two pieces of information offer credible and compelling evidence that an ozone plume originating from wildfire emissions was transported into the El Paso area and affected air quality at the El Paso UTEP (CAMS 12) monitoring site by causing an exceedance of the 2015 eight-hour ozone NAAQS.

Backwards and forward HYSPLIT trajectories provide even better evidence of the likelihood of ozone, CO, and $PM_{2.5}$ transport from the Hog fire to the El Paso UTEP (CAMS 12) monitoring site. Forward trajectories from the fire consistently pass almost directly over the monitoring site, while back trajectories only miss the Hog fire by the width of a single grid cell. Furthermore these trajectories are all at low levels over the Hog fire and the El Paso UTEP (CAMS 12) monitoring site. This greatly increases the likelihood that transported pollutants mixed down to affect air quality at the monitoring site. Imagery from Ranger Peak indicates that haze consistent with wildfire smoke was apparent over the El Paso-Ciudad Juarez on June 21, 2015. NO and NO_2 measurements taken at El Paso UTEP (CAMS 12) and Chamizal (CAMS 41) provided strong evidence that very little ozone production occurred locally and that high levels of ozone were most likely transported into the El Paso-Ciudad Juarez area from elsewhere.

In conclusion, the similarity of the June 26, 2011, surrogate to June 21, 2015, shows that it is very unlikely that June 21, 2015, would have experienced eight-hour average ozone measurements of 77 ppb without the presence of the Hog fire in Arizona.

CHAPTER 4: PUBLIC COMMENTS

In following the requirements listed in Title 40 of the Code of Federal Regulations (CFR) §50.14(c)(3)(i), *Treatment of air quality monitoring data influenced by exceptional events*, the Texas Commission on Environmental Quality (TCEQ) posted this Exceptional Events Demonstration Package in the "Hot Topics" section of the Agency website for public comment from August 24 through September 26, 2016. In accordance with 40 CFR §50.14(c)(3)(v), the TCEQ is documenting the public comments received in this section. All comments received during the comment period are included in *Appendix E: Public Comments*.

CHAPTER 5: REFERENCES

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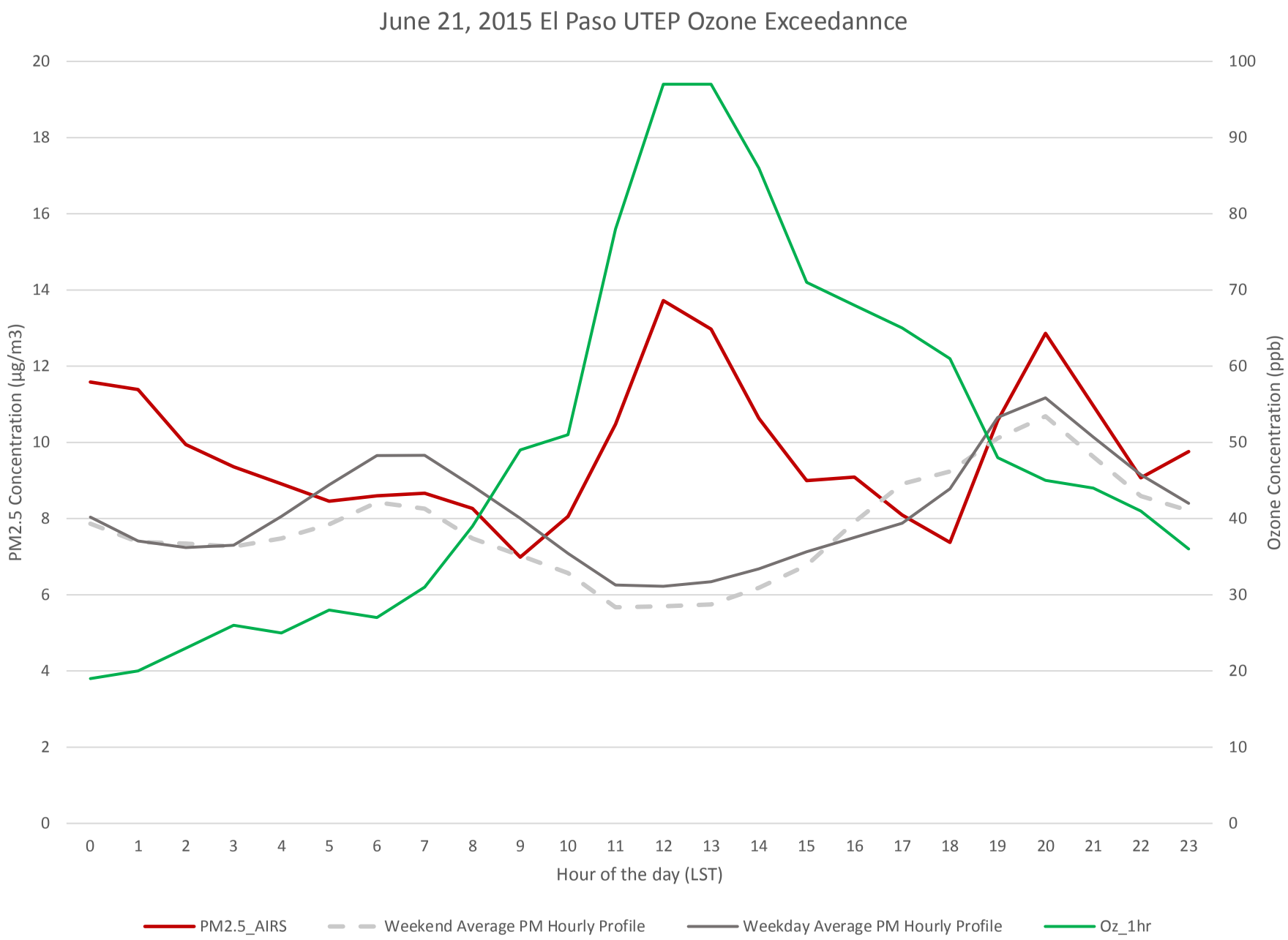
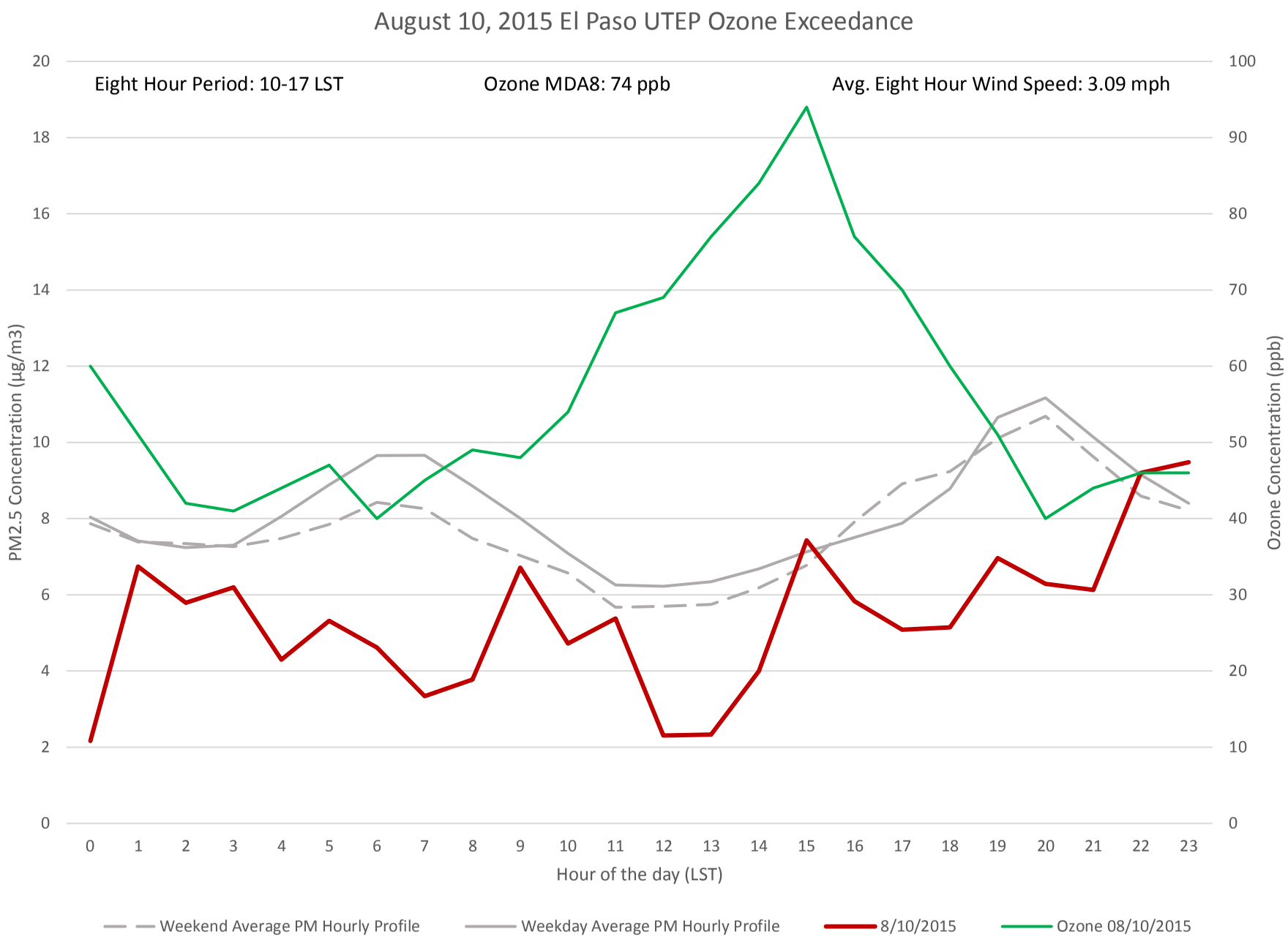
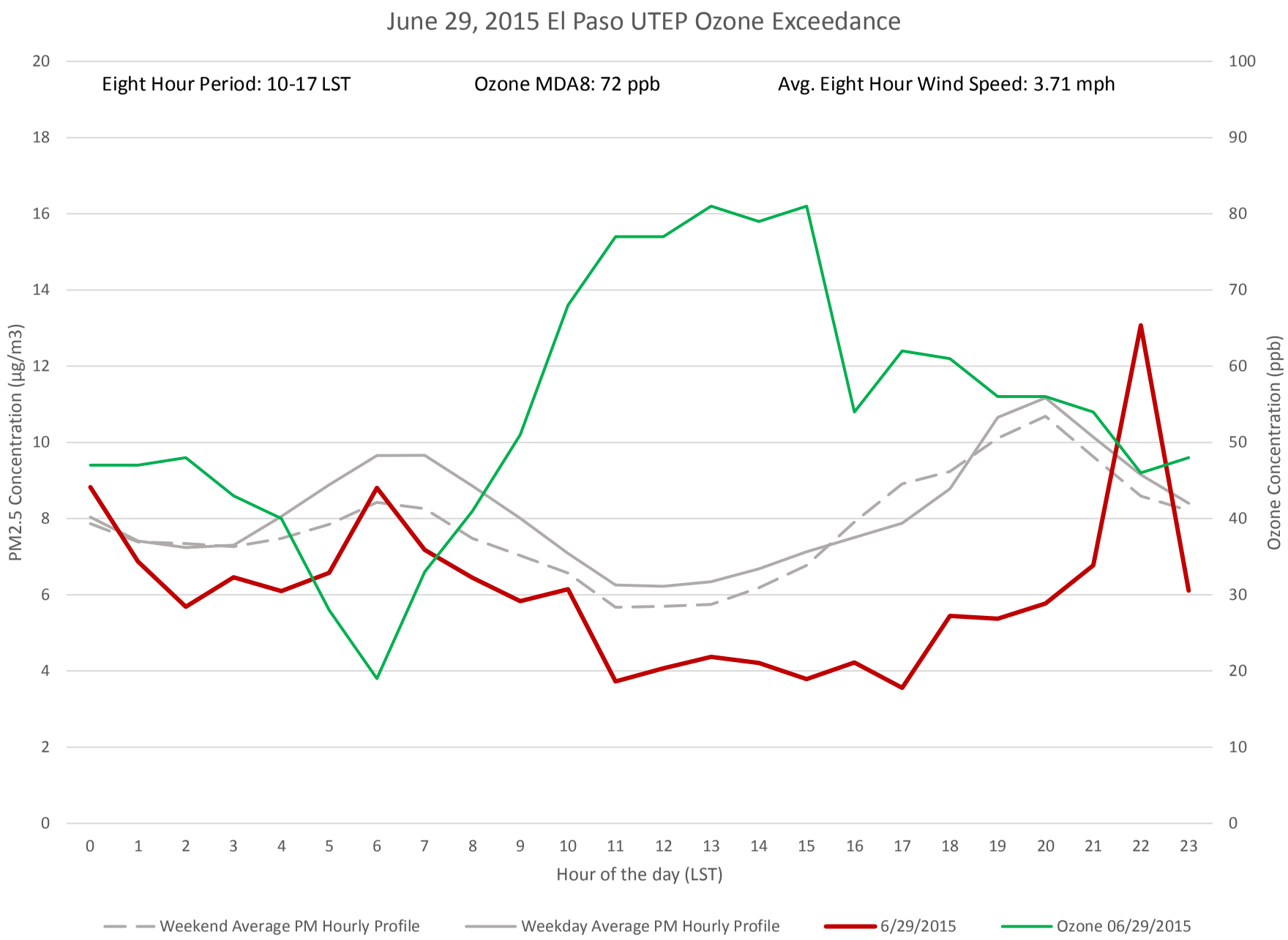
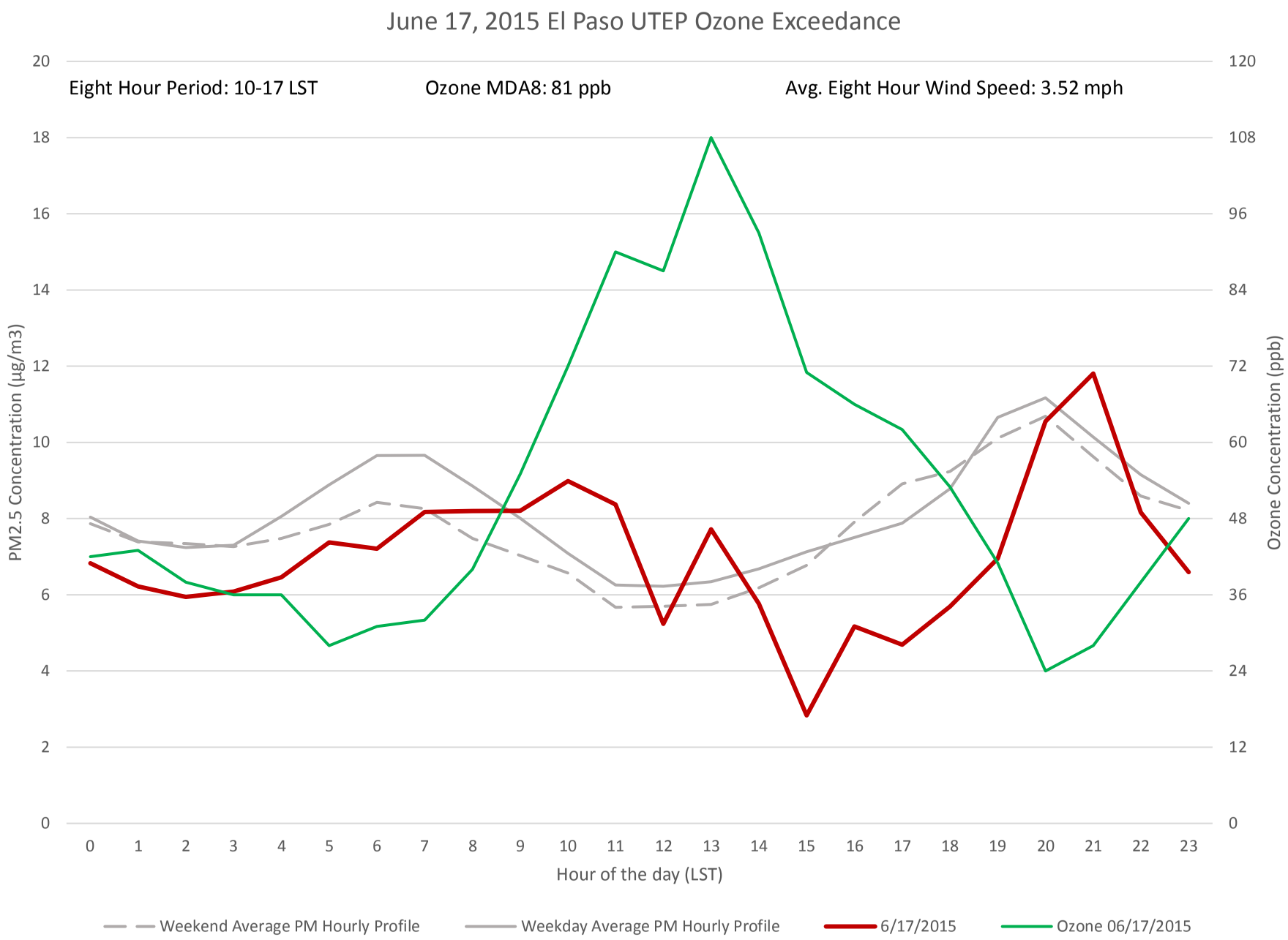
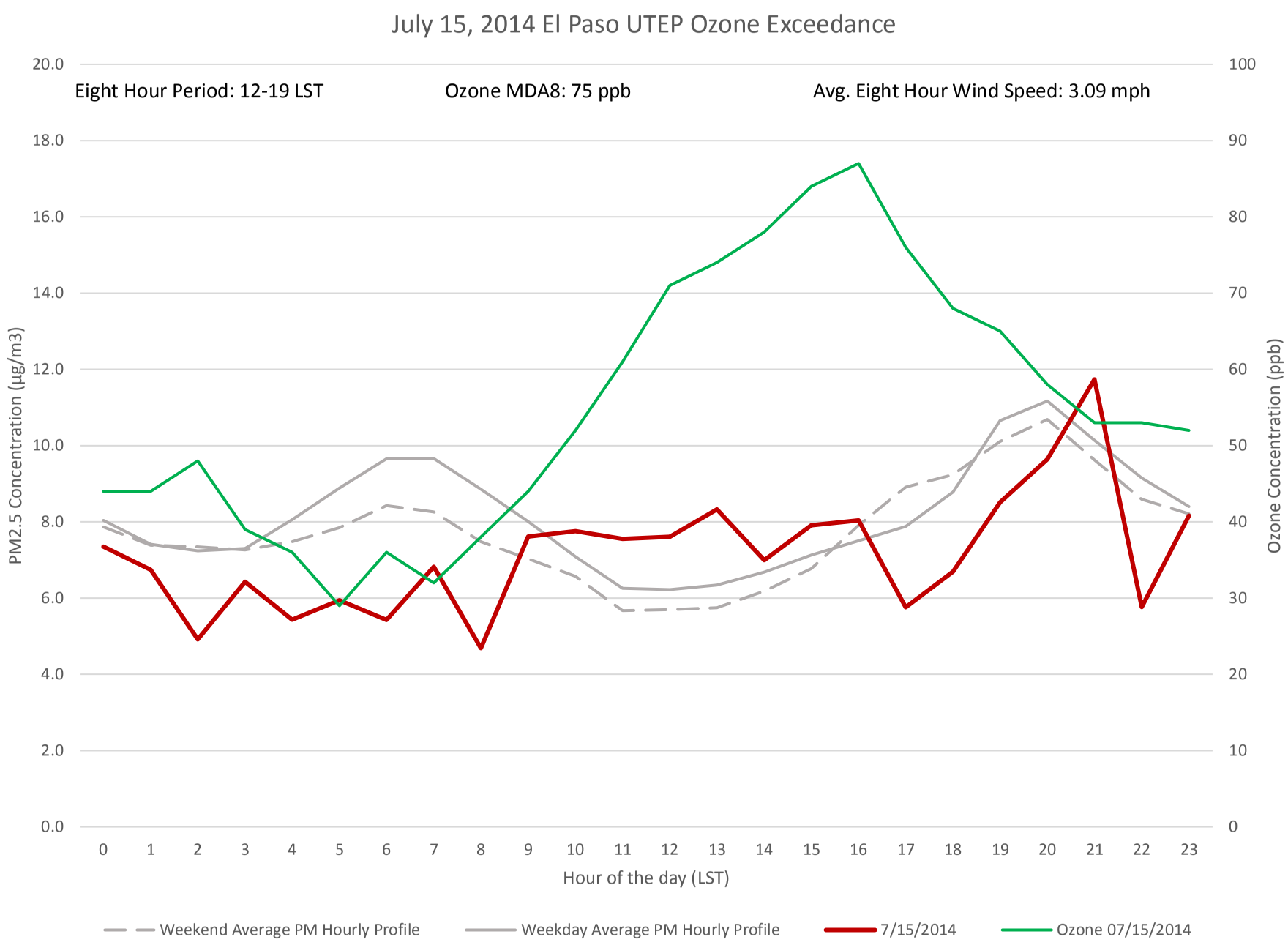
APPENDIX A: A REVIEW OF EL PASO UTEP (CAMS 12) MONITORING SITE EXCEEDANCE DAYS

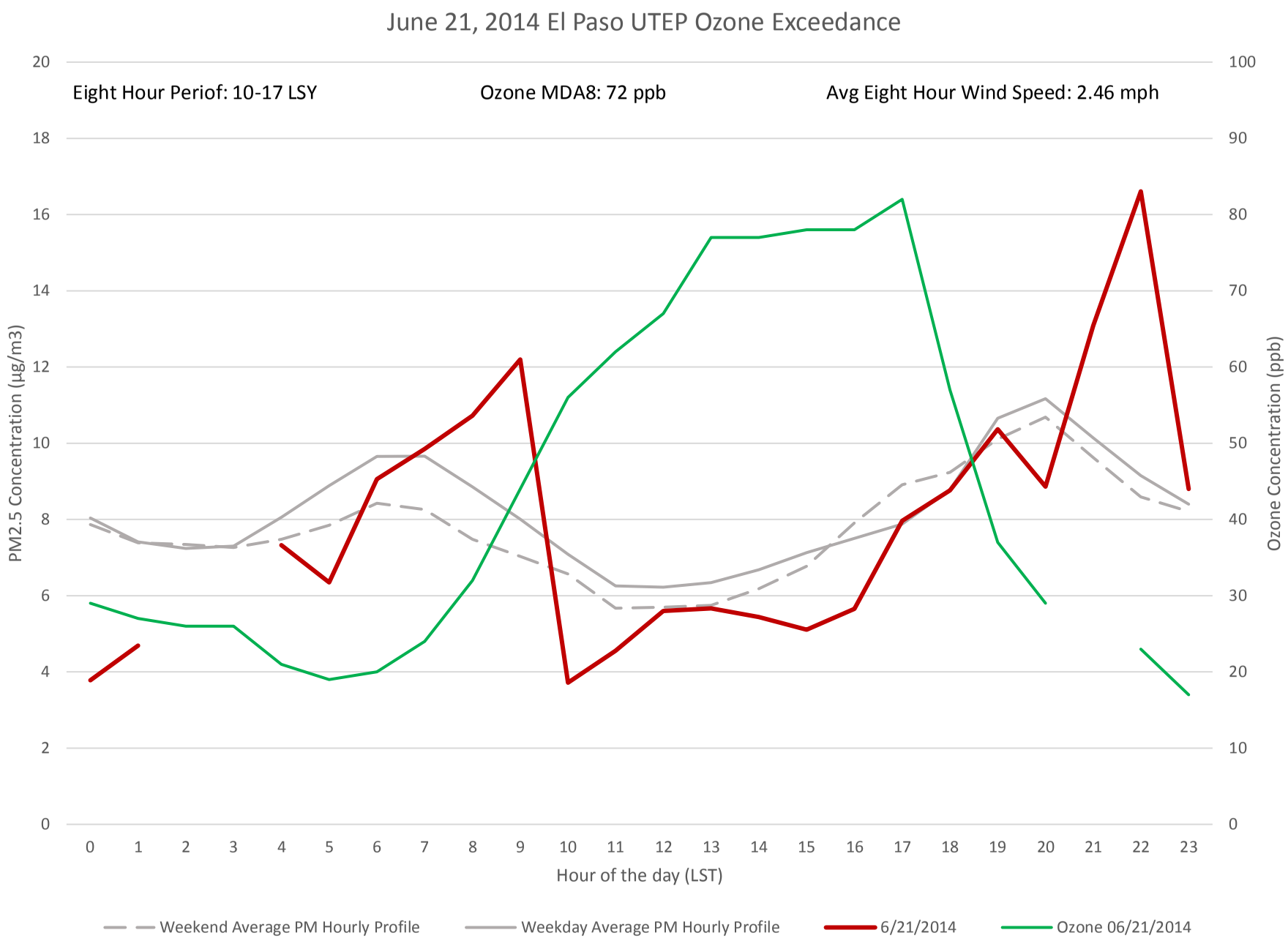

June 21, 2015 El Paso UTEP Ozone Exceedannce
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
PM2.5_AIRS
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
Oz_1hr


August 10, 2015 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 74 ppb
Avg. Eight Hour Wind Speed: 3.09 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
8/10/2015
Ozone 08/10/2015


June 29, 2015 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 72 ppb
Avg. Eight Hour Wind Speed: 3.71 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
6/29/2015
Ozone 06/29/2015


June 17, 2015 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 81 ppb
Avg. Eight Hour Wind Speed: 3.52 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
6/17/2015
Ozone 06/17/2015


July 15, 2014 El Paso UTEP Ozone Exceedance
Eight Hour Period: 12-19 LST
Ozone MDA8: 75 ppb
Avg. Eight Hour Wind Speed: 3.09 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
7/15/2014
Ozone 07/15/2014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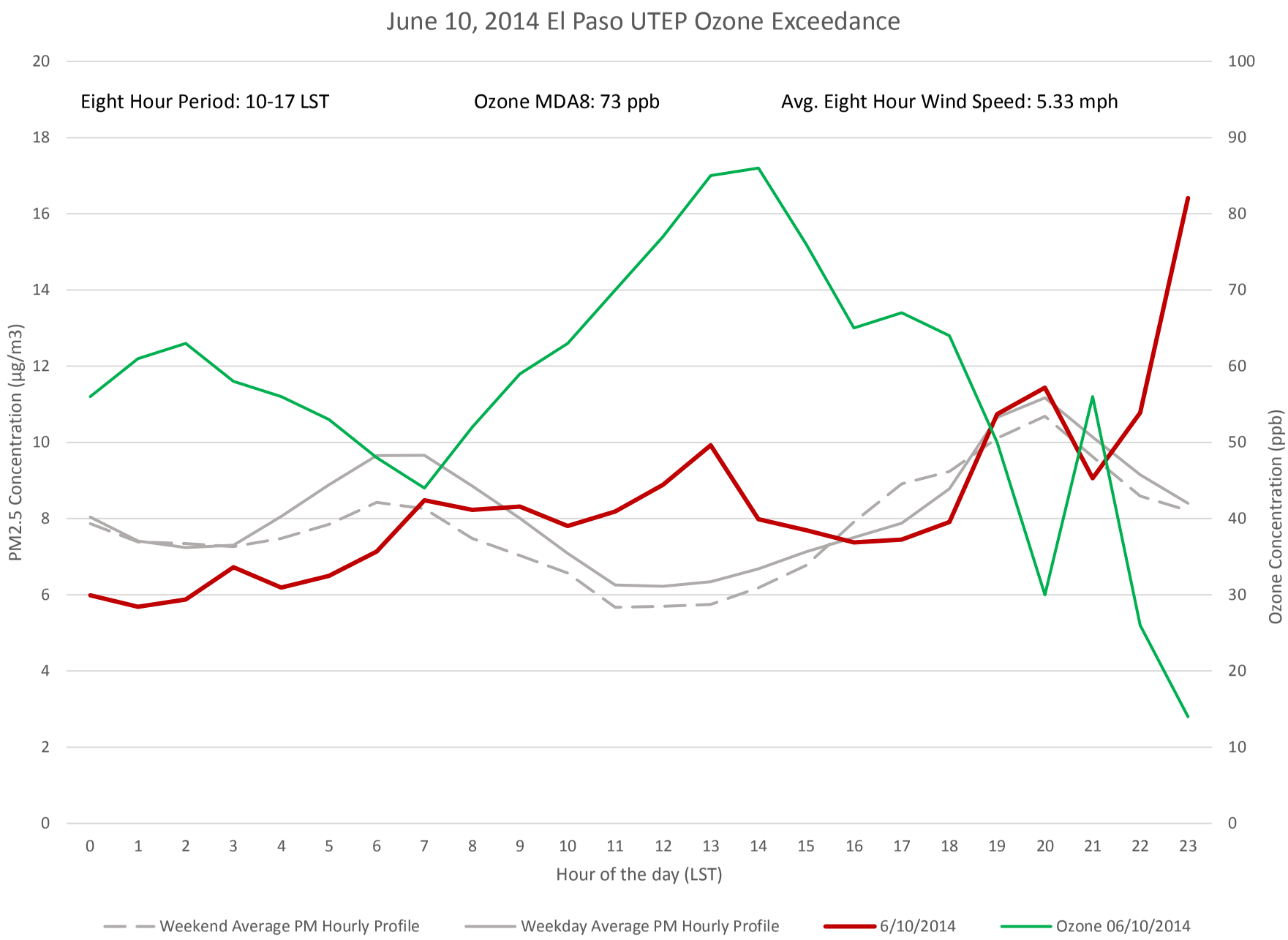
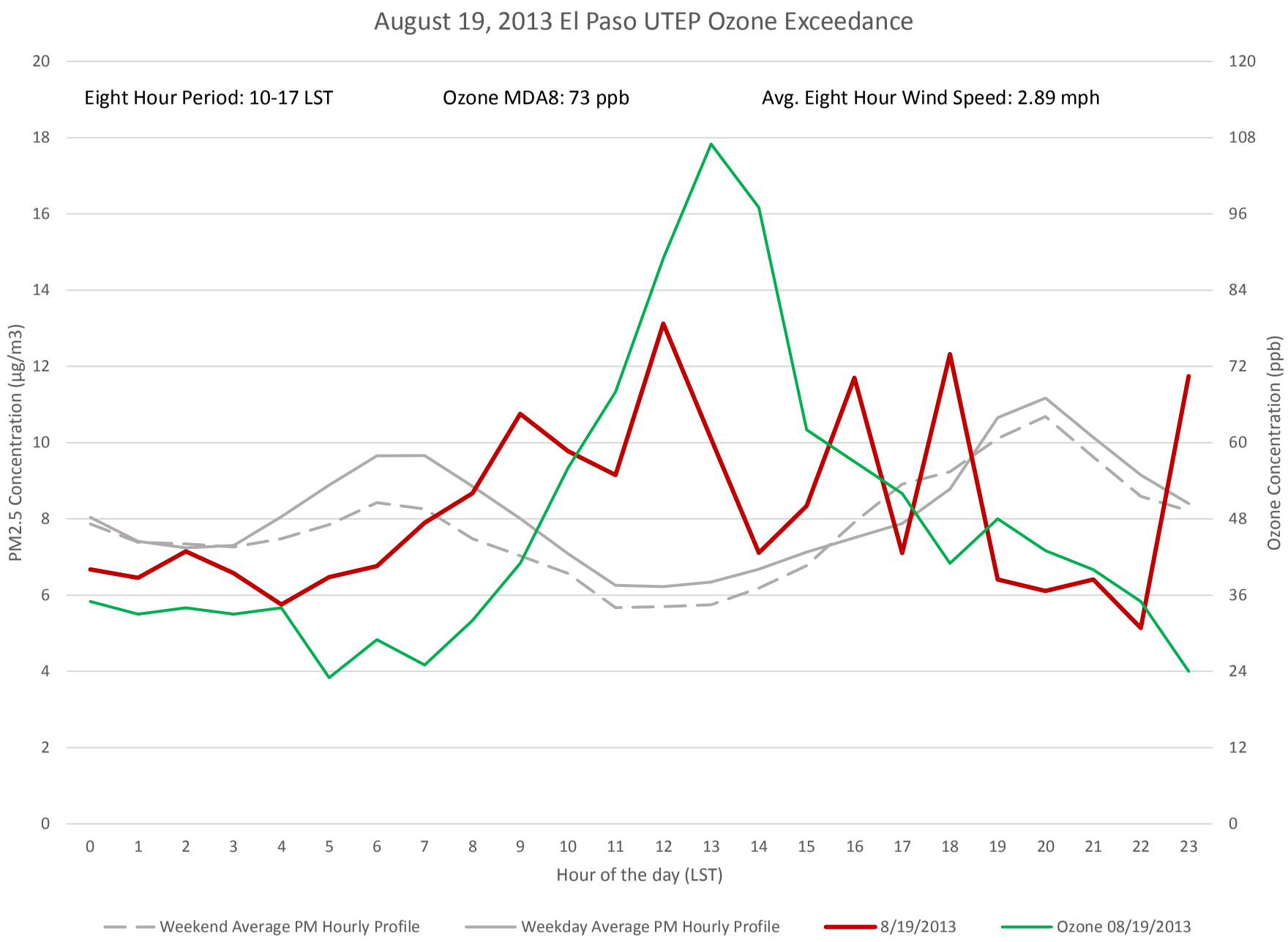
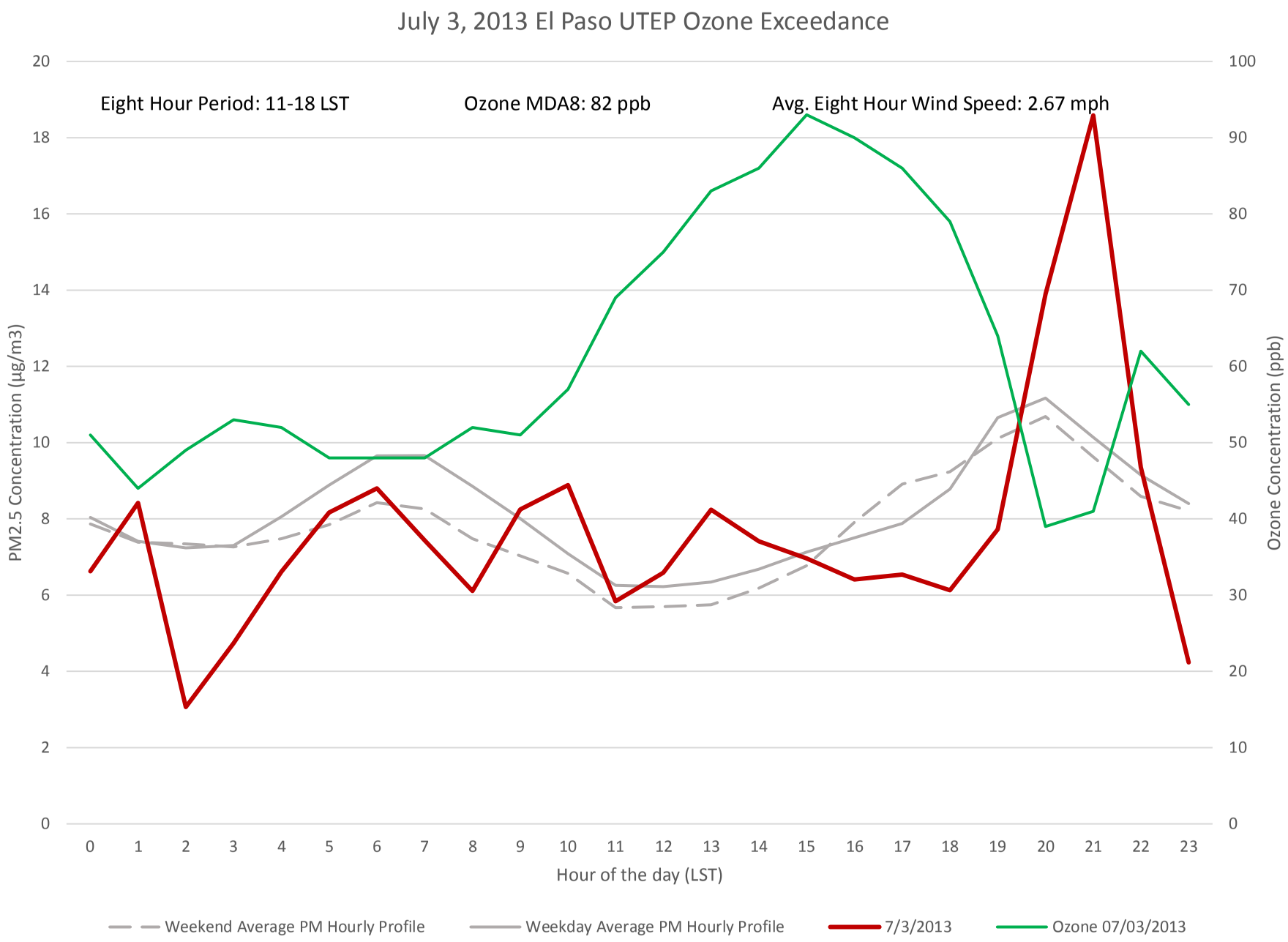
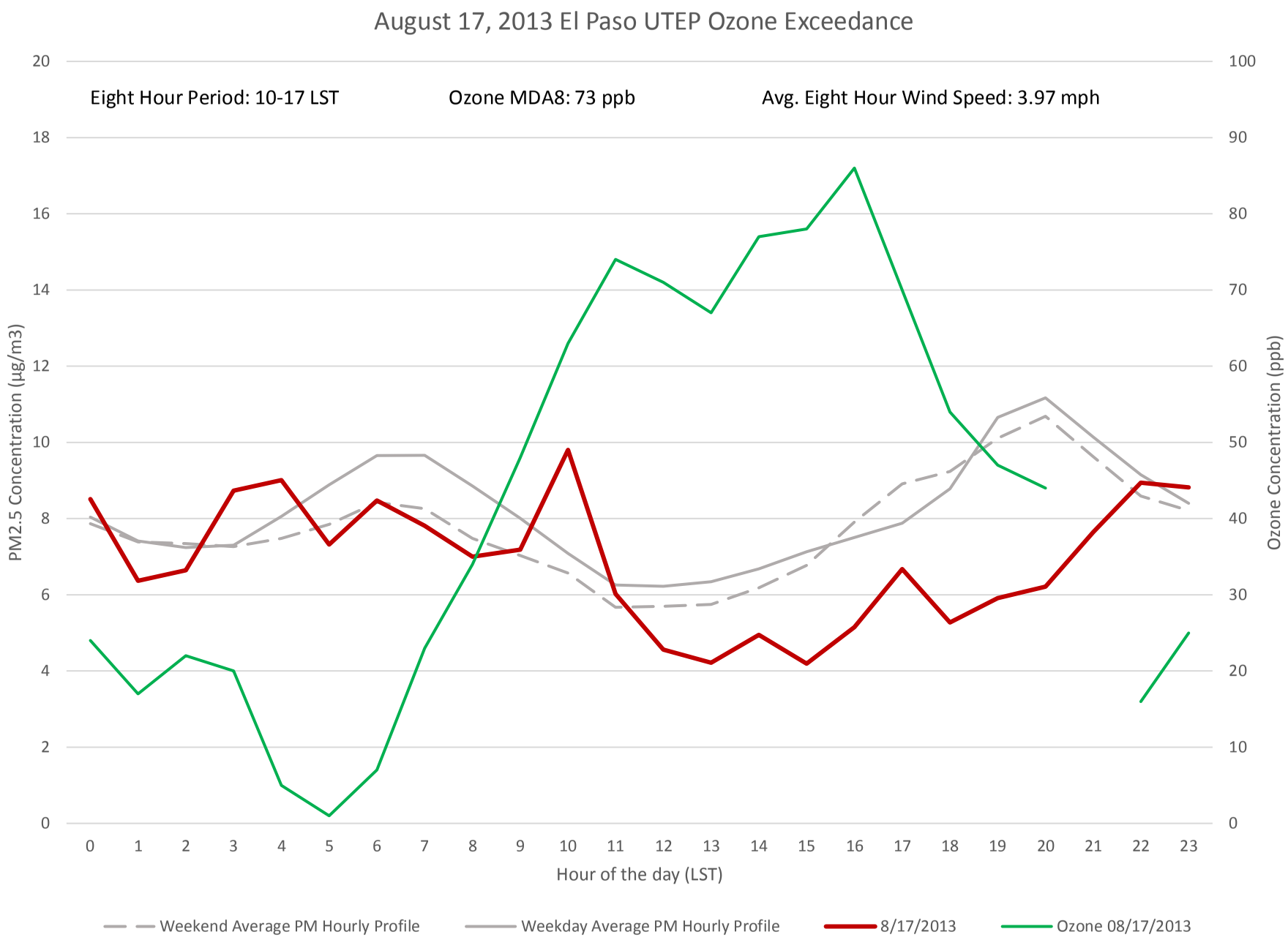
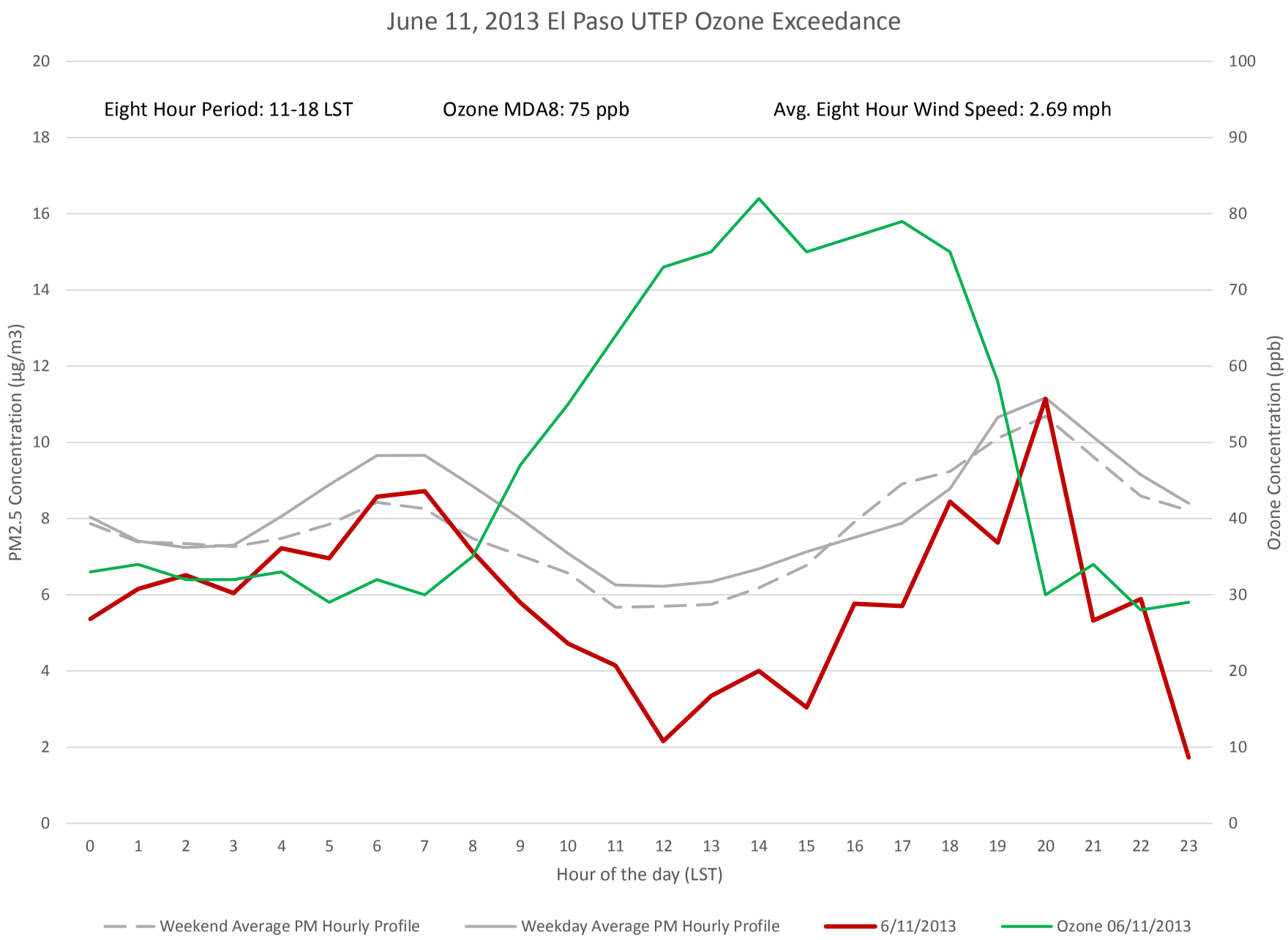
Eight Hour Periof: 10-17 LSY
Ozone MDA8: 72 ppb
Avg Eight Hour Wind Speed: 2.46 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
6/21/2014
Ozone 06/21/2014

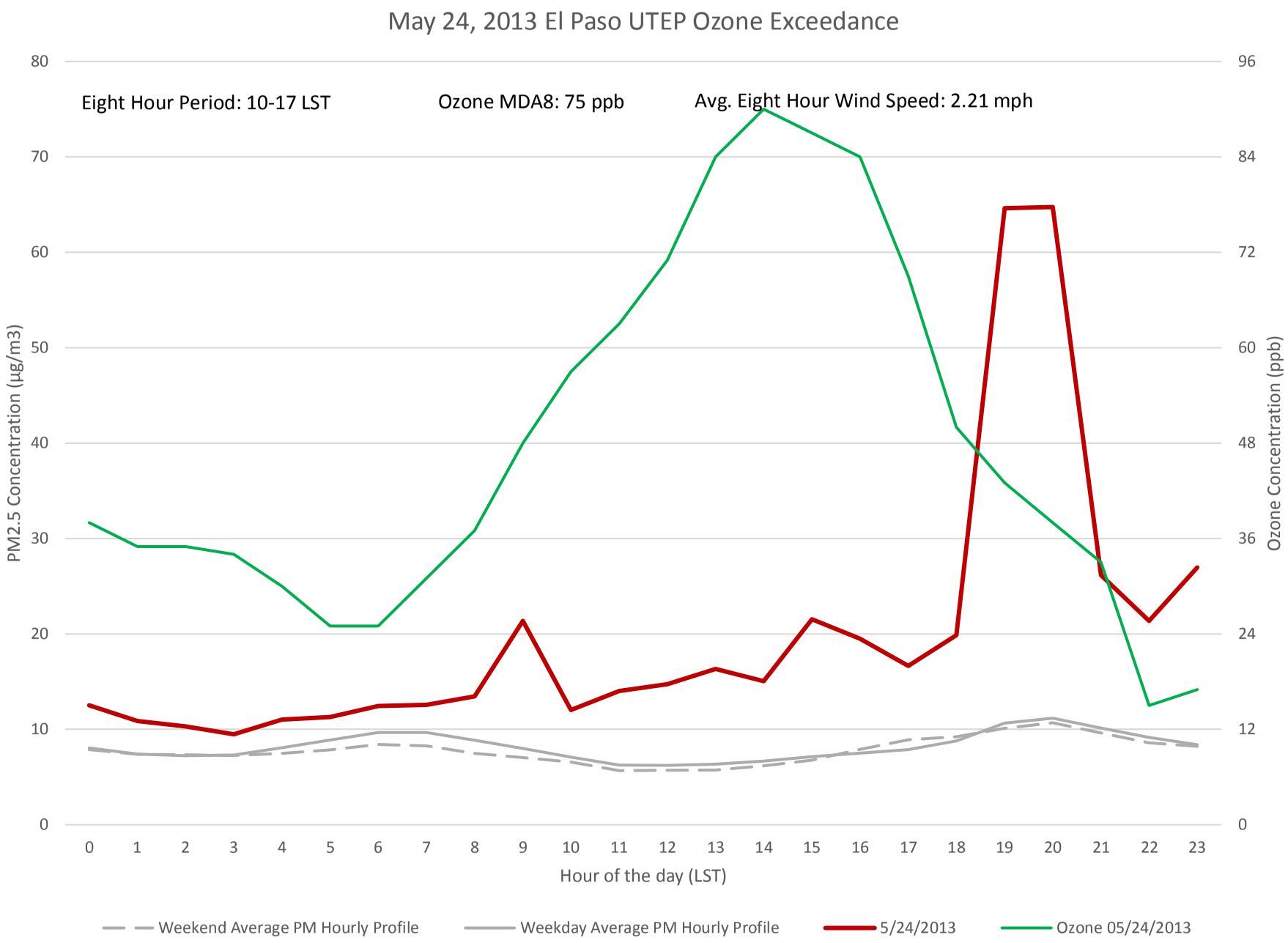

June 10, 2014 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 73 ppb
Avg. Eight Hour Wind Speed: 5.33 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
6/10/2014
Ozone 06/10/2014


August 19, 2013 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 73 ppb
Avg. Eight Hour Wind Speed: 2.89 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
8/19/2013
Ozone 08/19/2013


July 3, 2013 El Paso UTEP Ozone Exceedance
Eight Hour Period: 11-18 LST
Ozone MDA8: 82 ppb
Avg. Eight Hour Wind Speed: 2.67 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
7/3/2013
Ozone 07/03/2013


August 17, 2013 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 73 ppb
Avg. Eight Hour Wind Speed: 3.97 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
8/17/2013
Ozone 08/17/2013


June 11, 2013 El Paso UTEP Ozone Exceedance
Eight Hour Period: 11-18 LST
Ozone MDA8: 75 ppb
Avg. Eight Hour Wind Speed: 2.69 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
6/11/2013
Ozone 06/11/2013


May 24, 2013 El Paso UTEP Ozone Exceedance
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Ozone MDA8: 75 ppb
Avg. Eight Hour Wind Speed: 2.21 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
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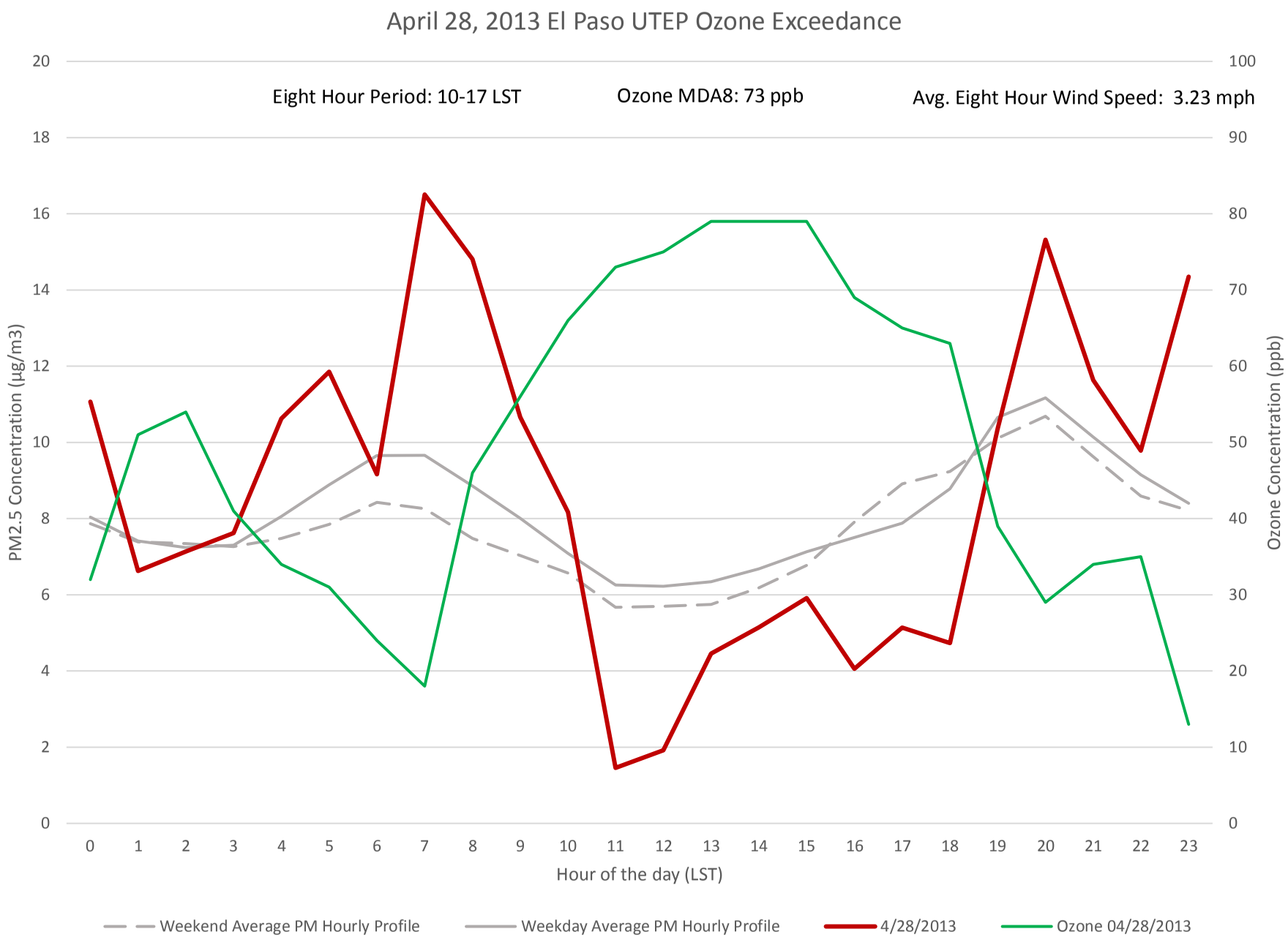
Ozone 05/24/2013


April 28, 2013 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 73 ppb
Avg. Eight Hour Wind Speed: 3.23 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
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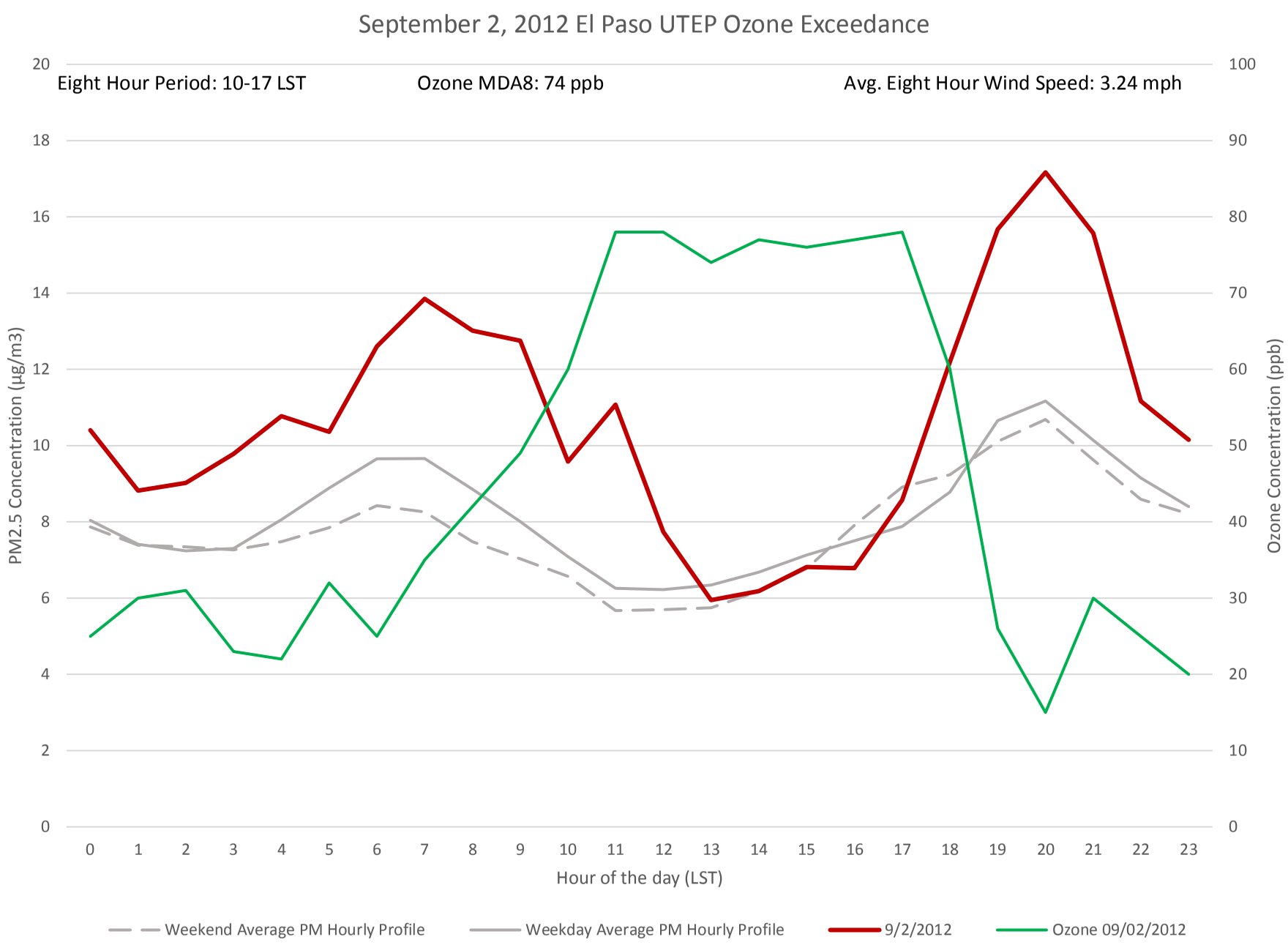
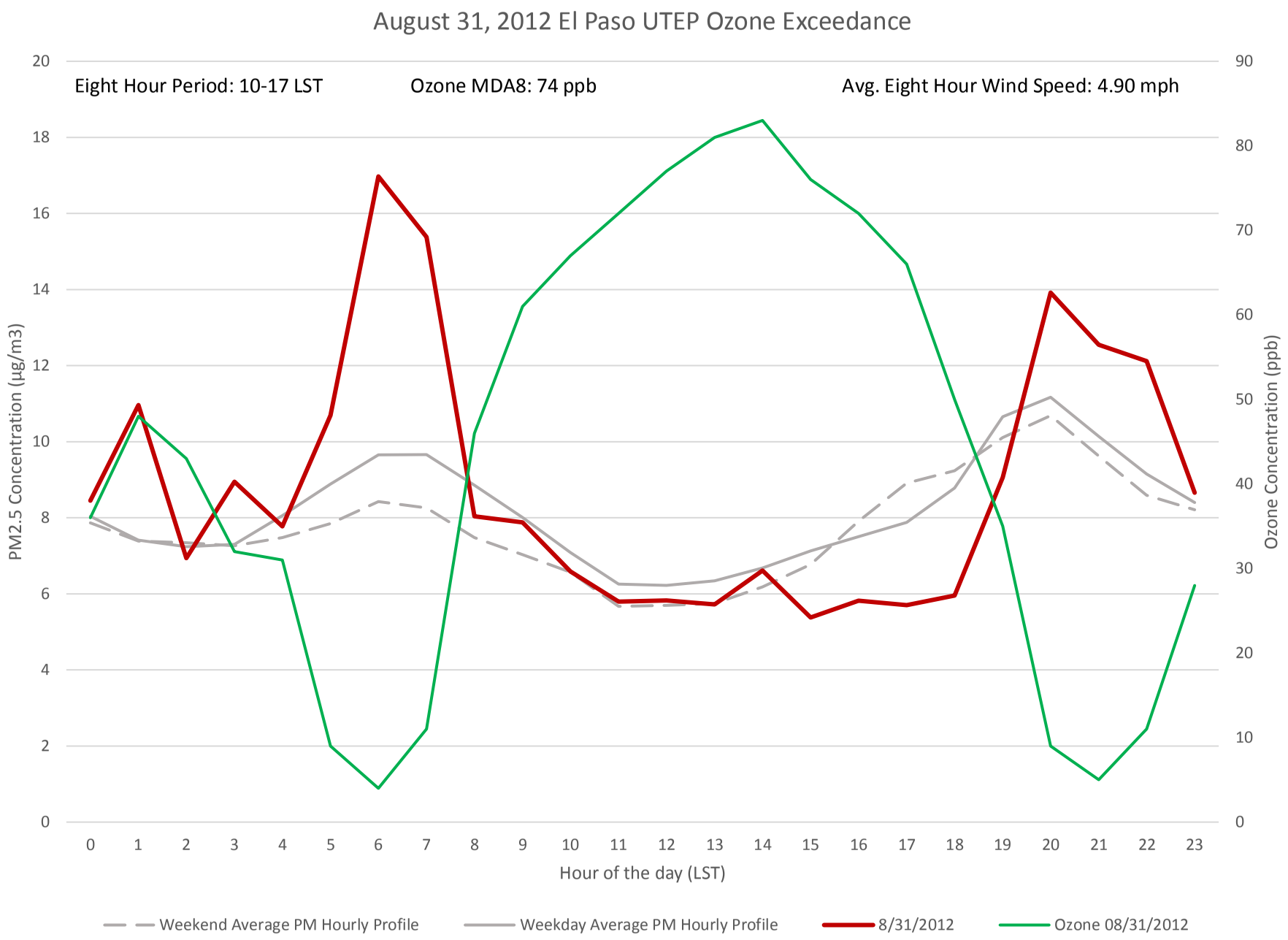
Ozone 04/28/2013


September 2, 2012 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 74 ppb
Avg. Eight Hour Wind Speed: 3.24 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
9/2/2012
Ozone 09/02/2012


August 31, 2012 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 74 ppb
Avg. Eight Hour Wind Speed: 4.90 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
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Weekday Average PM Hourly Profile
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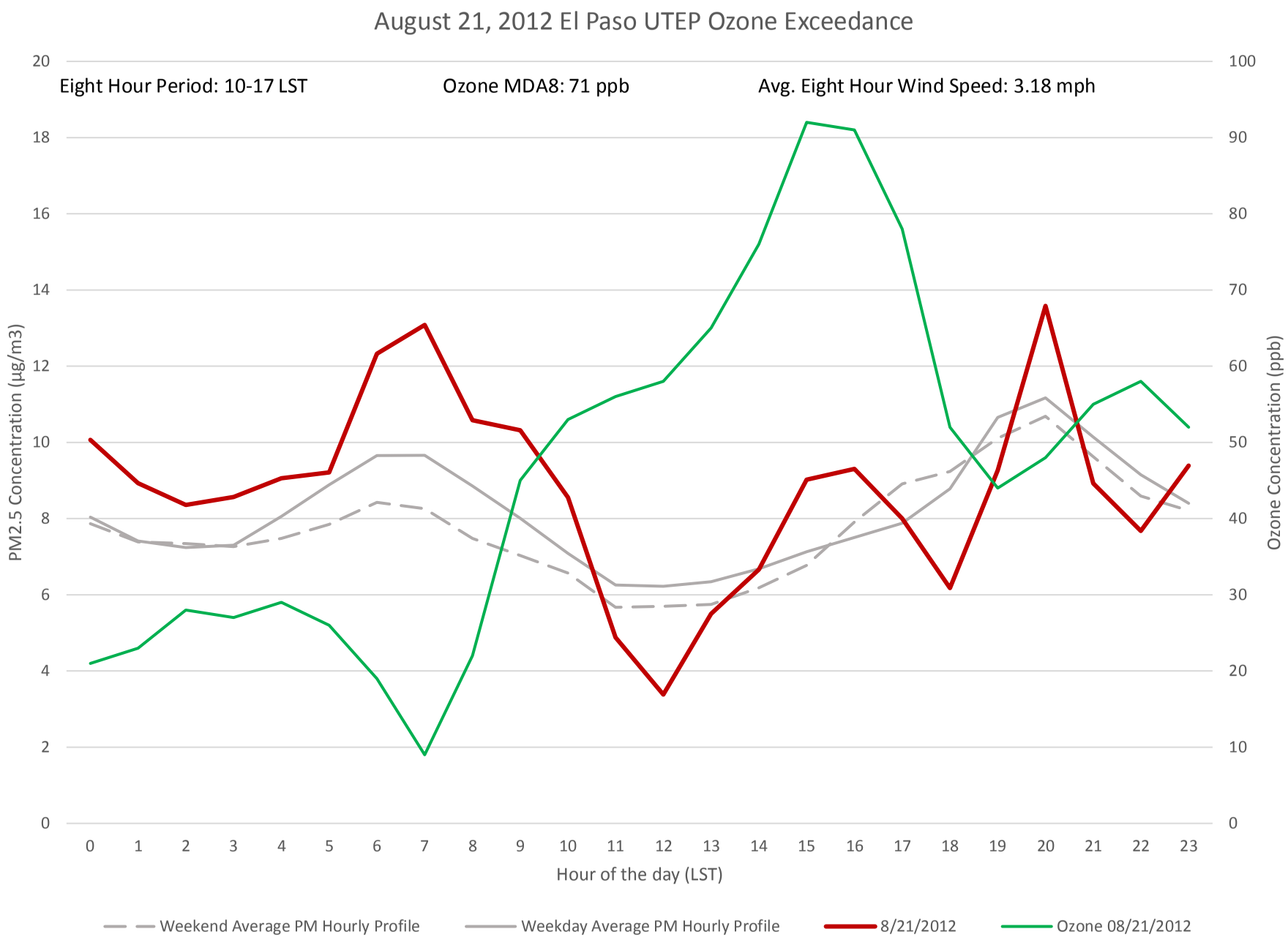
Ozone 08/31/2012


August 21, 2012 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 71 ppb
Avg. Eight Hour Wind Speed: 3.18 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
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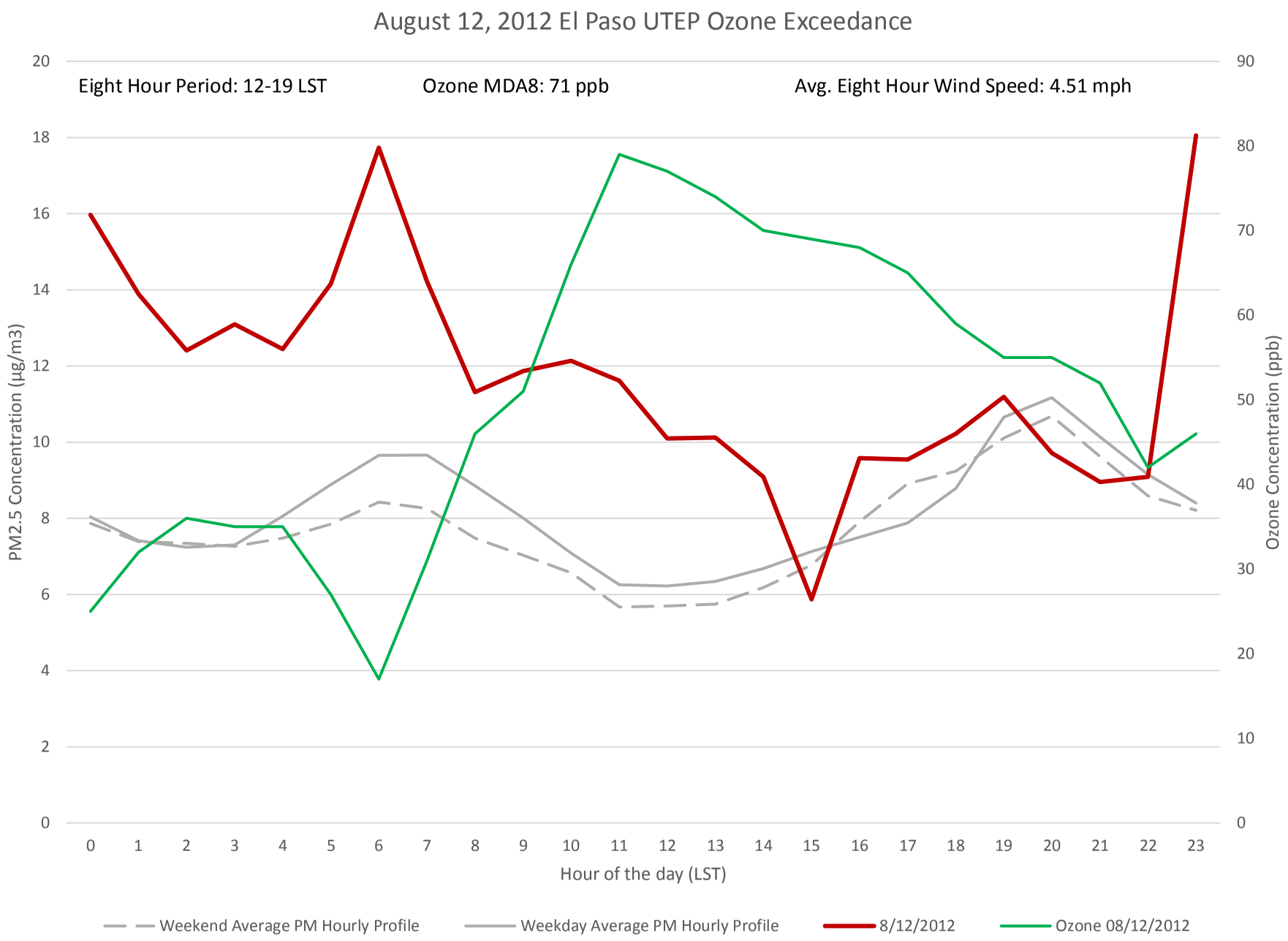
Ozone 08/21/2012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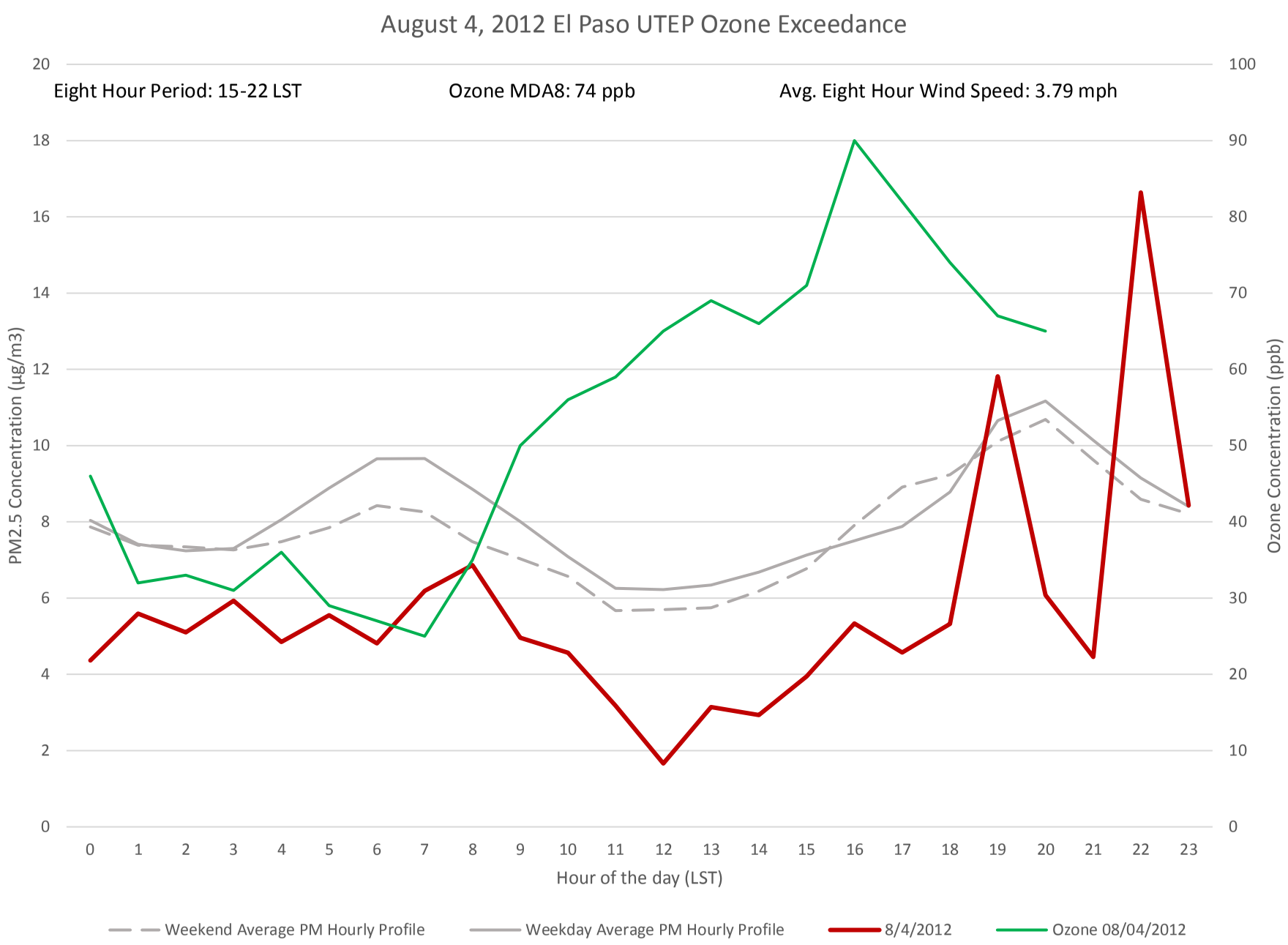
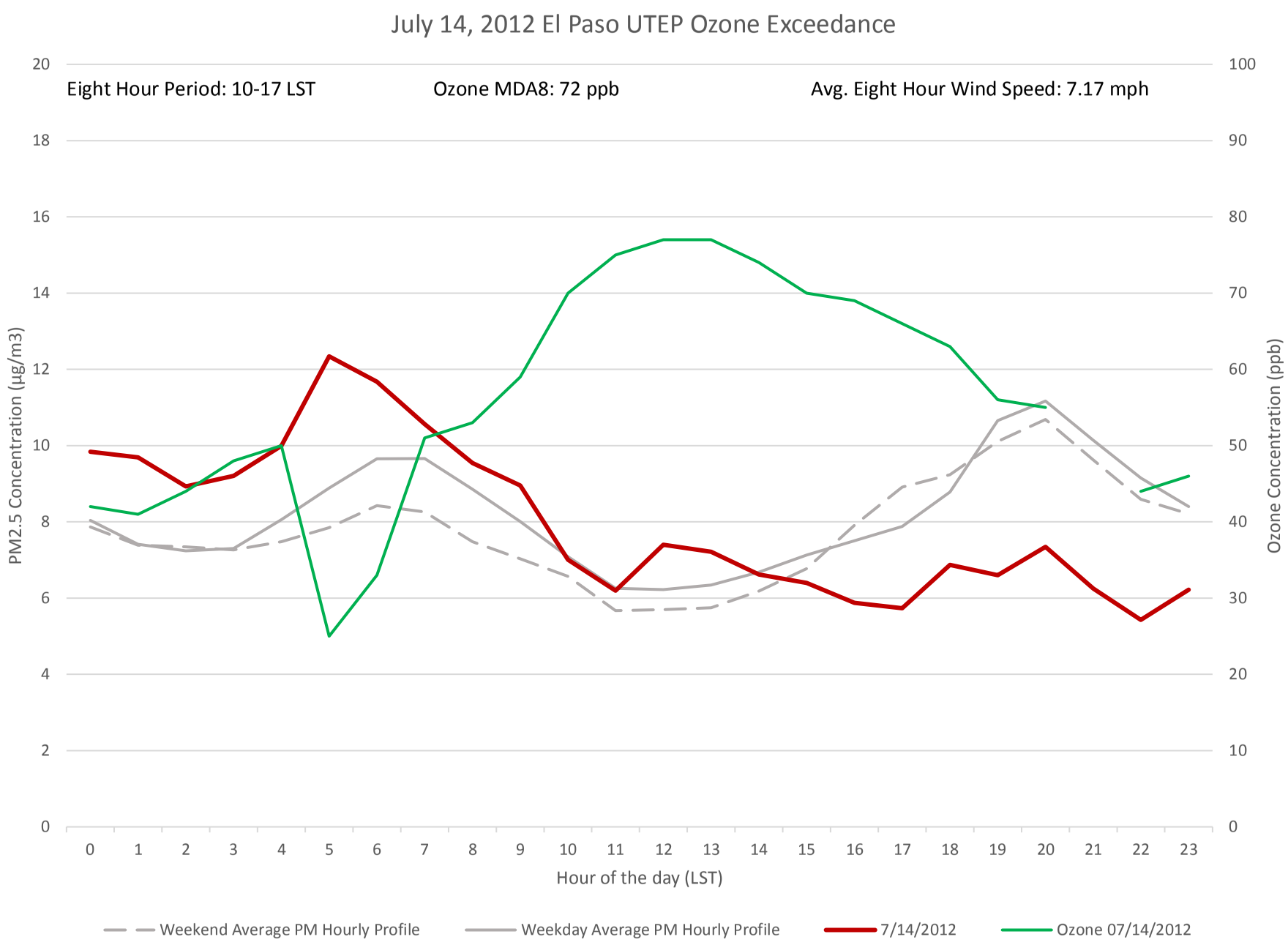
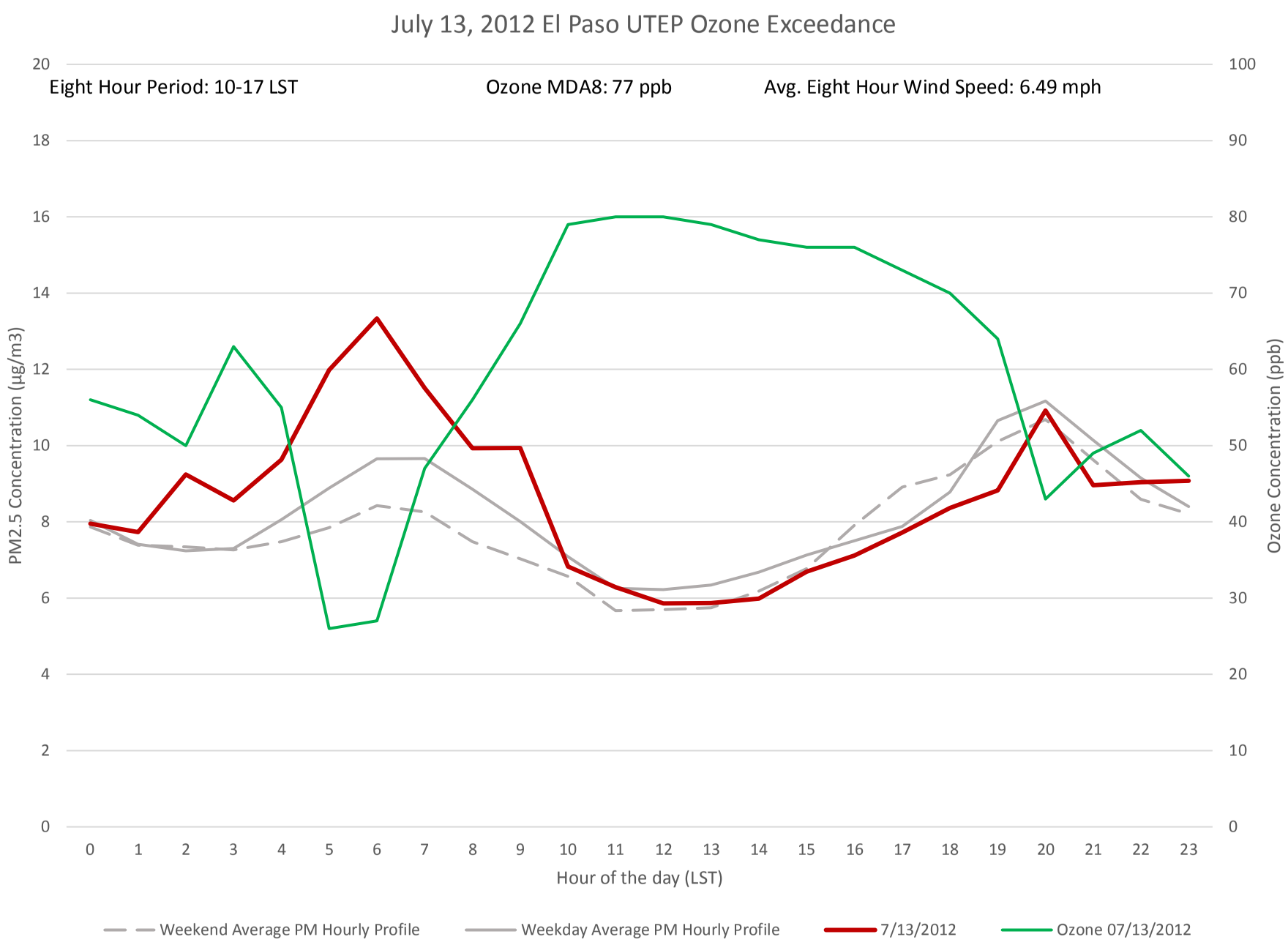
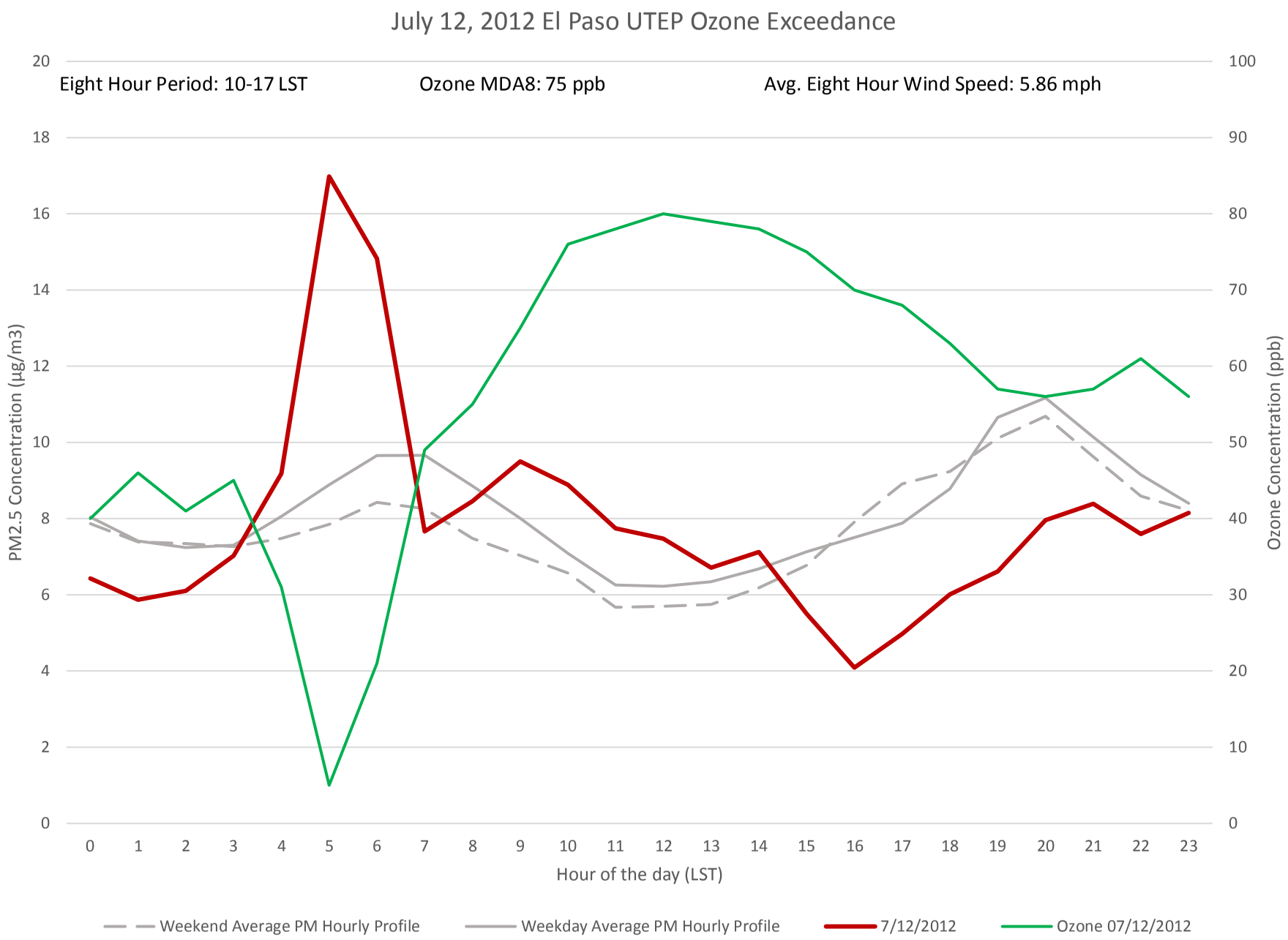
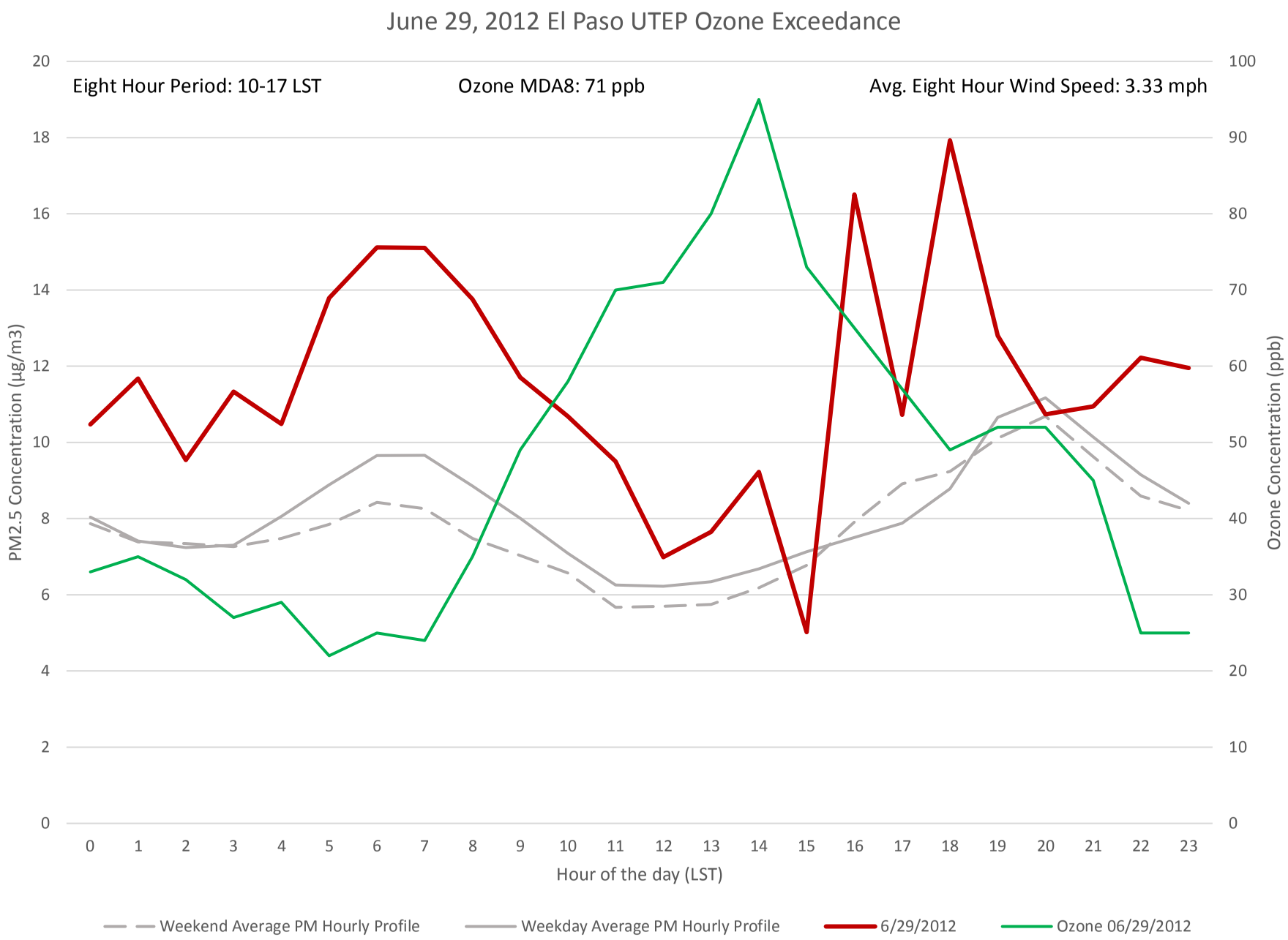
Eight Hour Period: 12-19 LST
Ozone MDA8: 71 ppb
Avg. Eight Hour Wind Speed: 4.51 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
8/12/2012
Ozone 08/12/2012

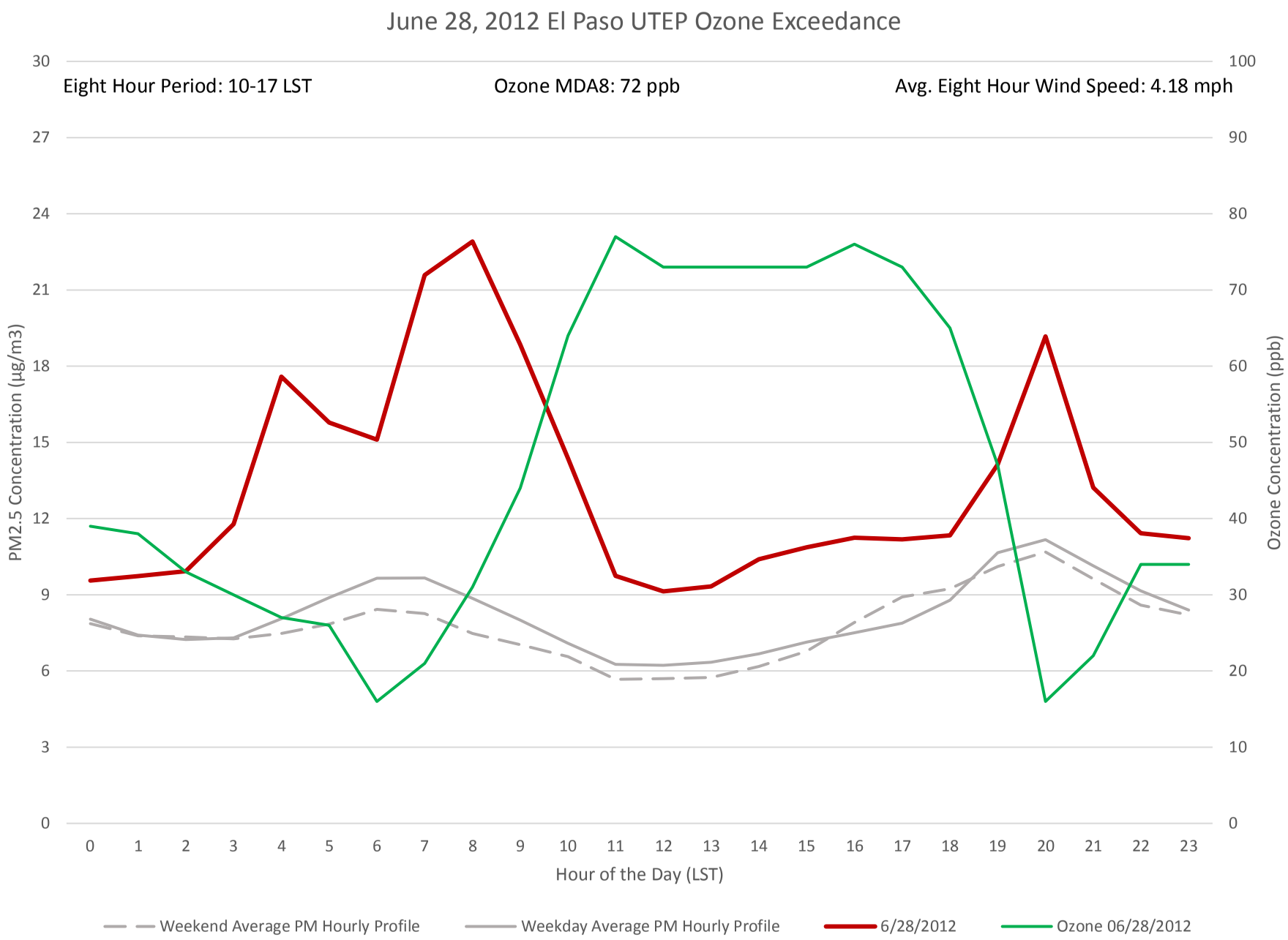

August 4, 2012 El Paso UTEP Ozone Exceedance
Eight Hour Period: 15-22 LST
Ozone MDA8: 74 ppb
Avg. Eight Hour Wind Speed: 3.79 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
8/4/2012
Ozone 08/04/2012

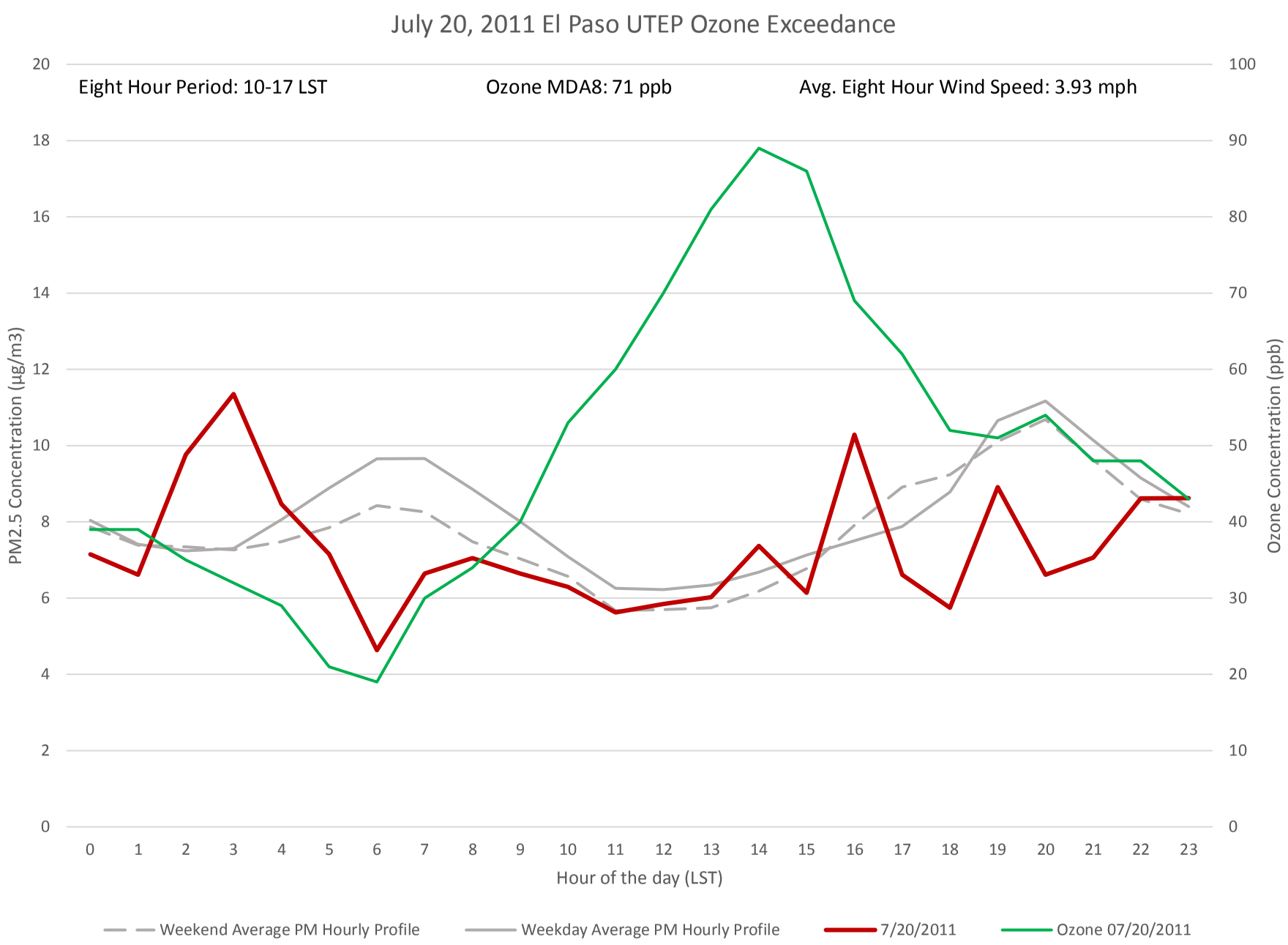

July 14, 2012 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 72 ppb
Avg. Eight Hour Wind Speed: 7.17 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
7/14/2012
Ozone 07/14/2012

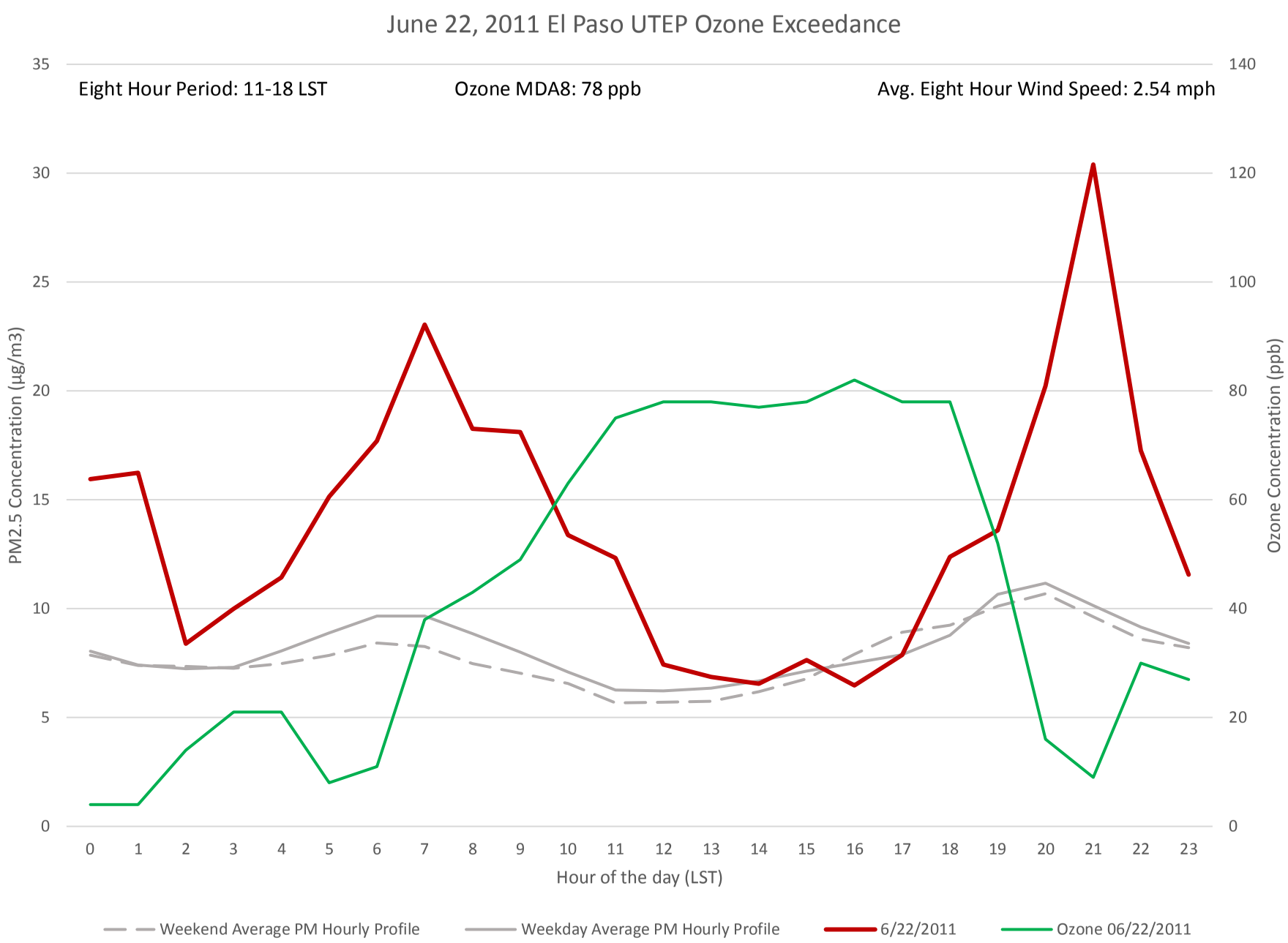

July 13, 2012 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 77 ppb
Avg. Eight Hour Wind Speed: 6.49 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
7/13/2012
Ozone 07/13/2012

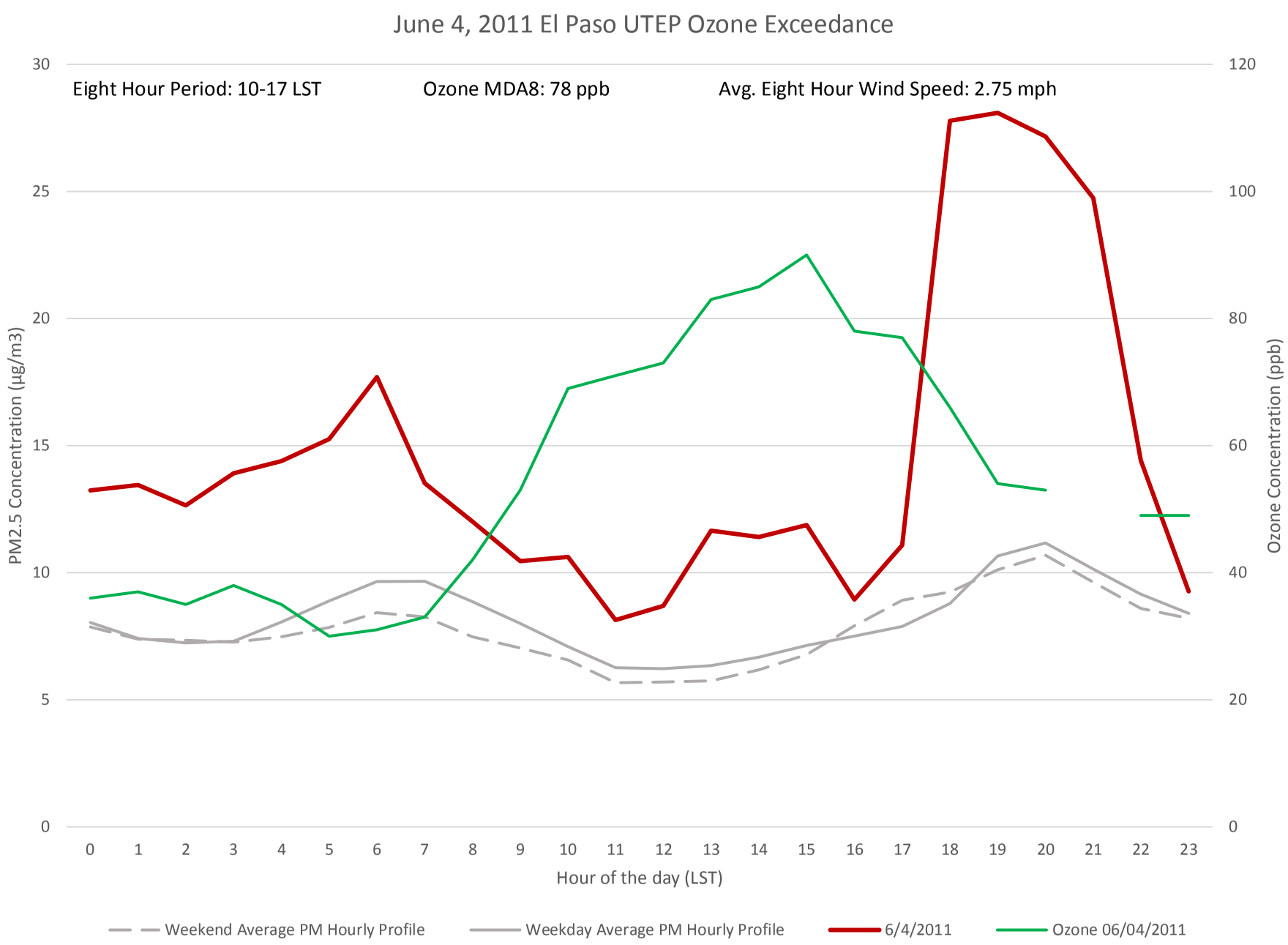

July 12, 2012 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 75 ppb
Avg. Eight Hour Wind Speed: 5.86 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
7/12/2012
Ozone 07/12/2012

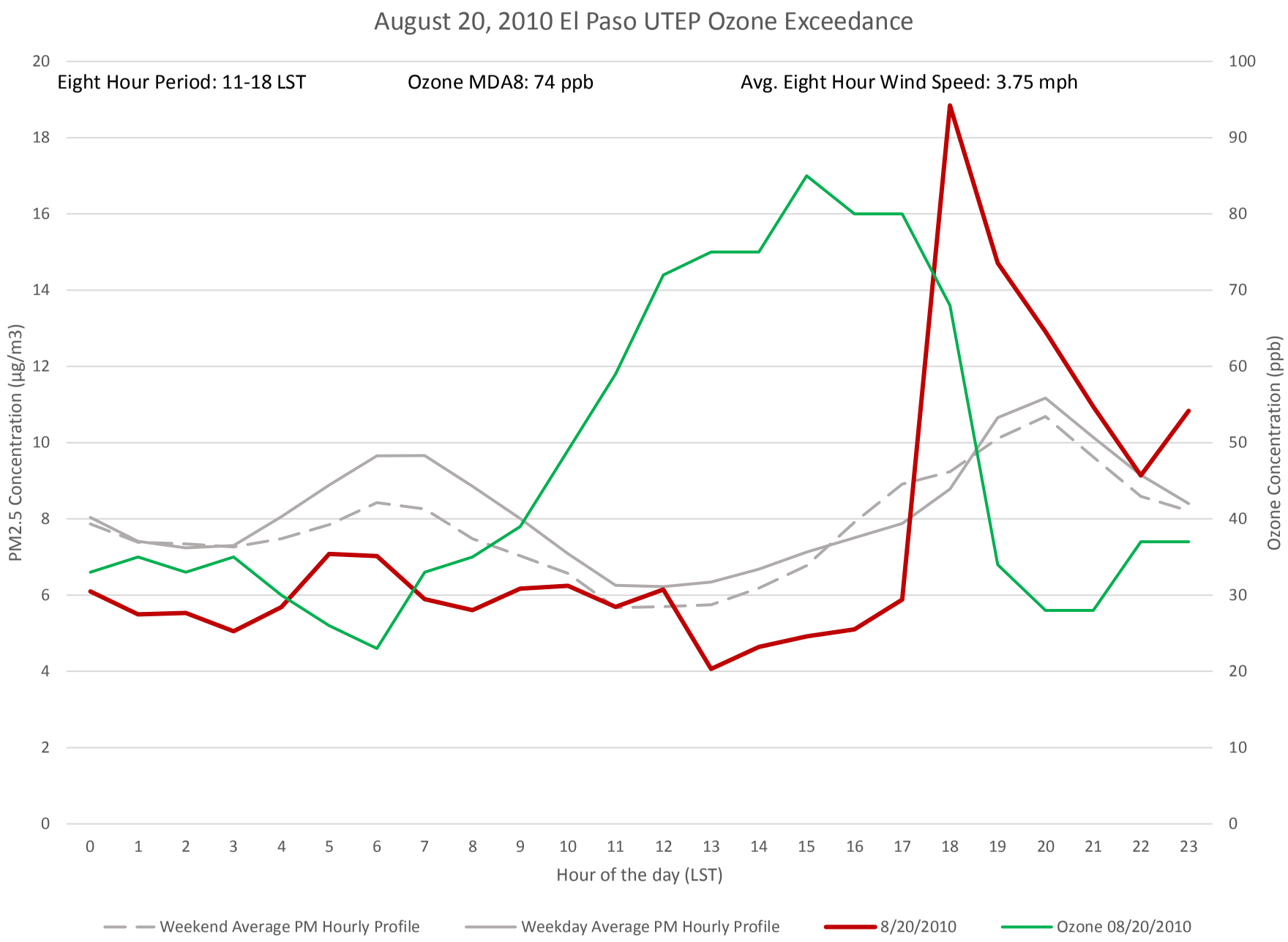

June 29, 2012 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 71 ppb
Avg. Eight Hour Wind Speed: 3.33 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
6/29/2012
Ozone 06/29/2012

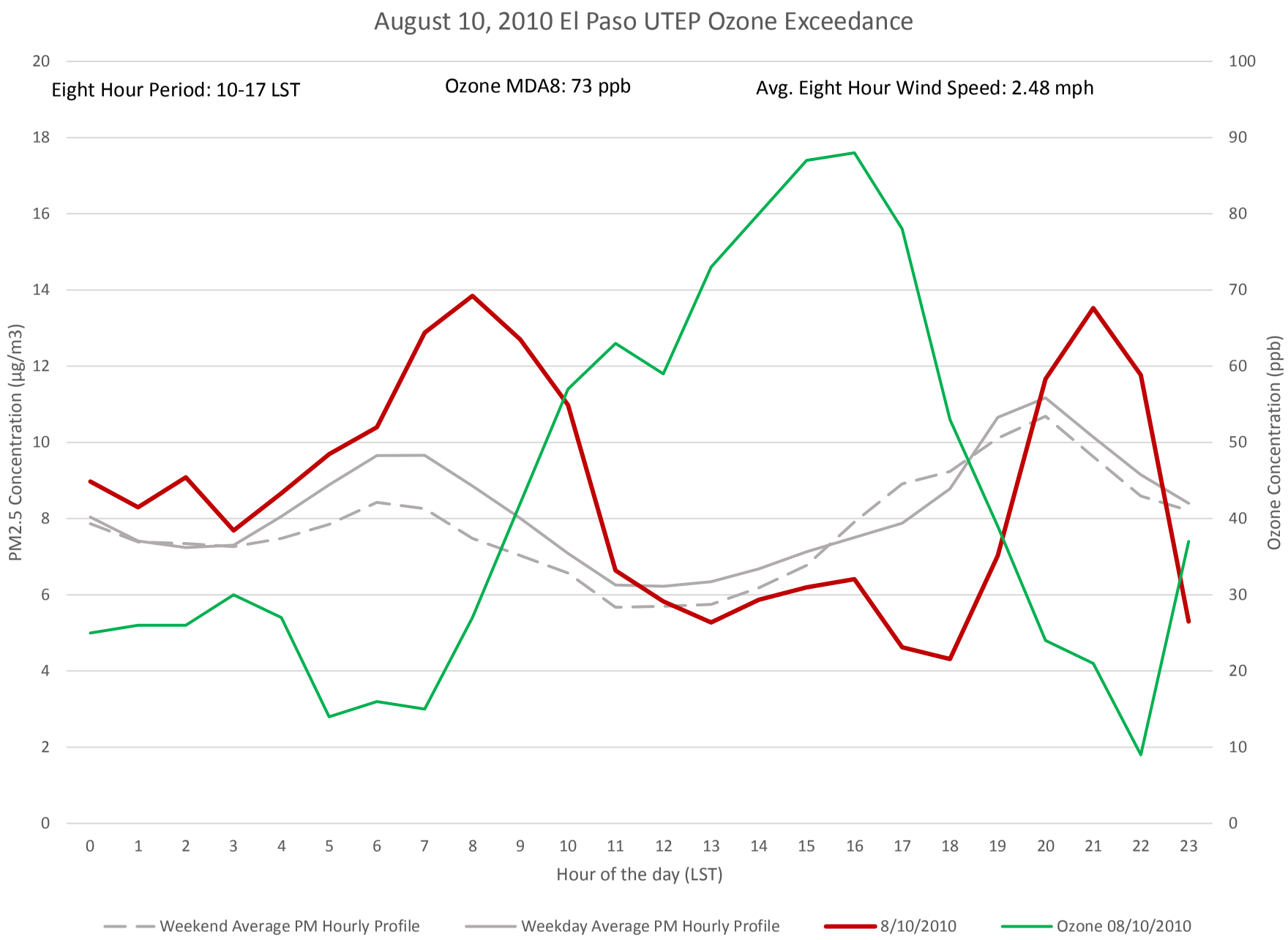

June 28, 2012 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 72 ppb
Avg. Eight Hour Wind Speed: 4.18 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the Day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
6/28/2012
Ozone 06/28/2012

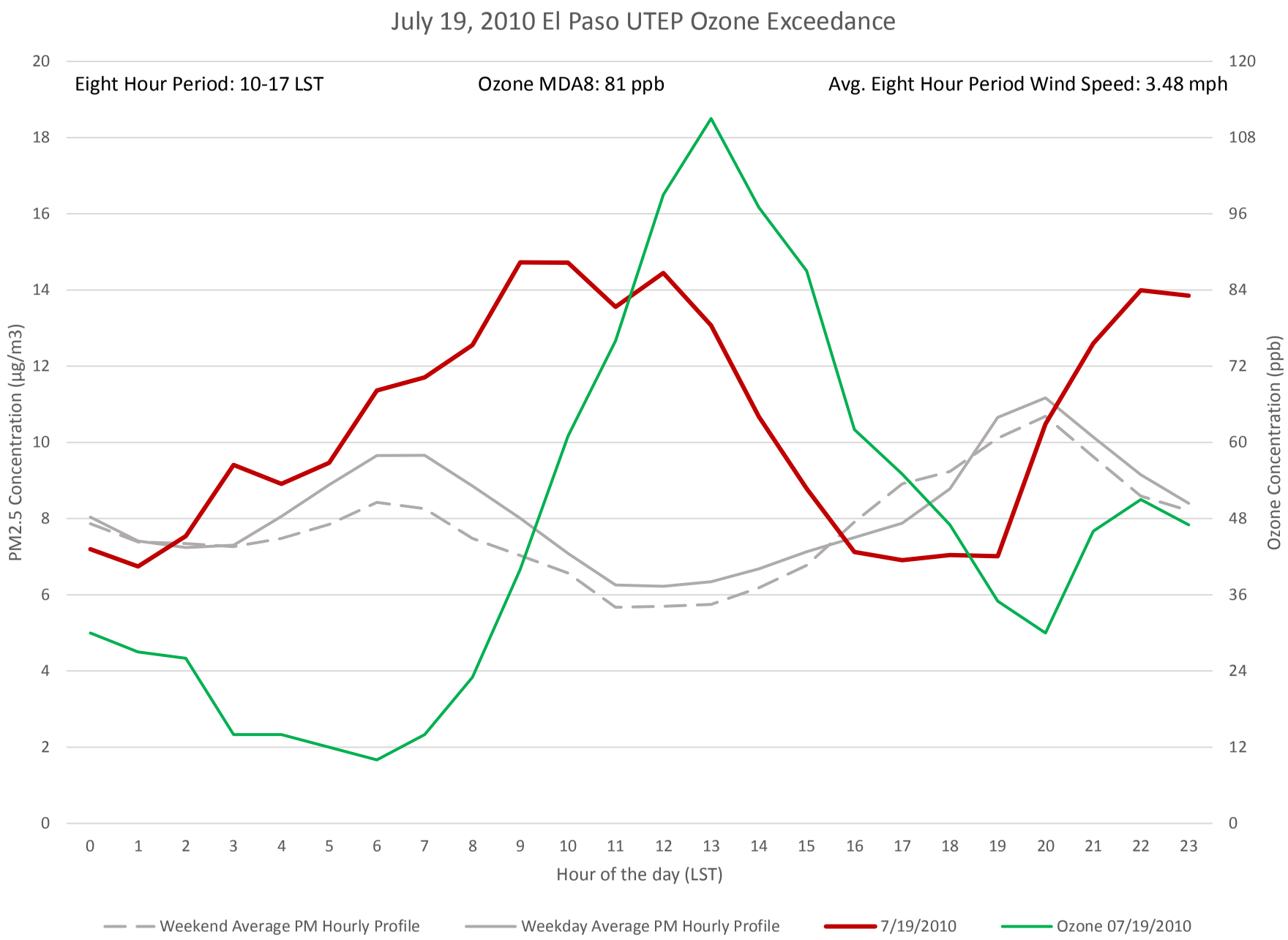

July 20, 2011 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 71 ppb
Avg. Eight Hour Wind Speed: 3.93 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
7/20/2011
Ozone 07/20/2011

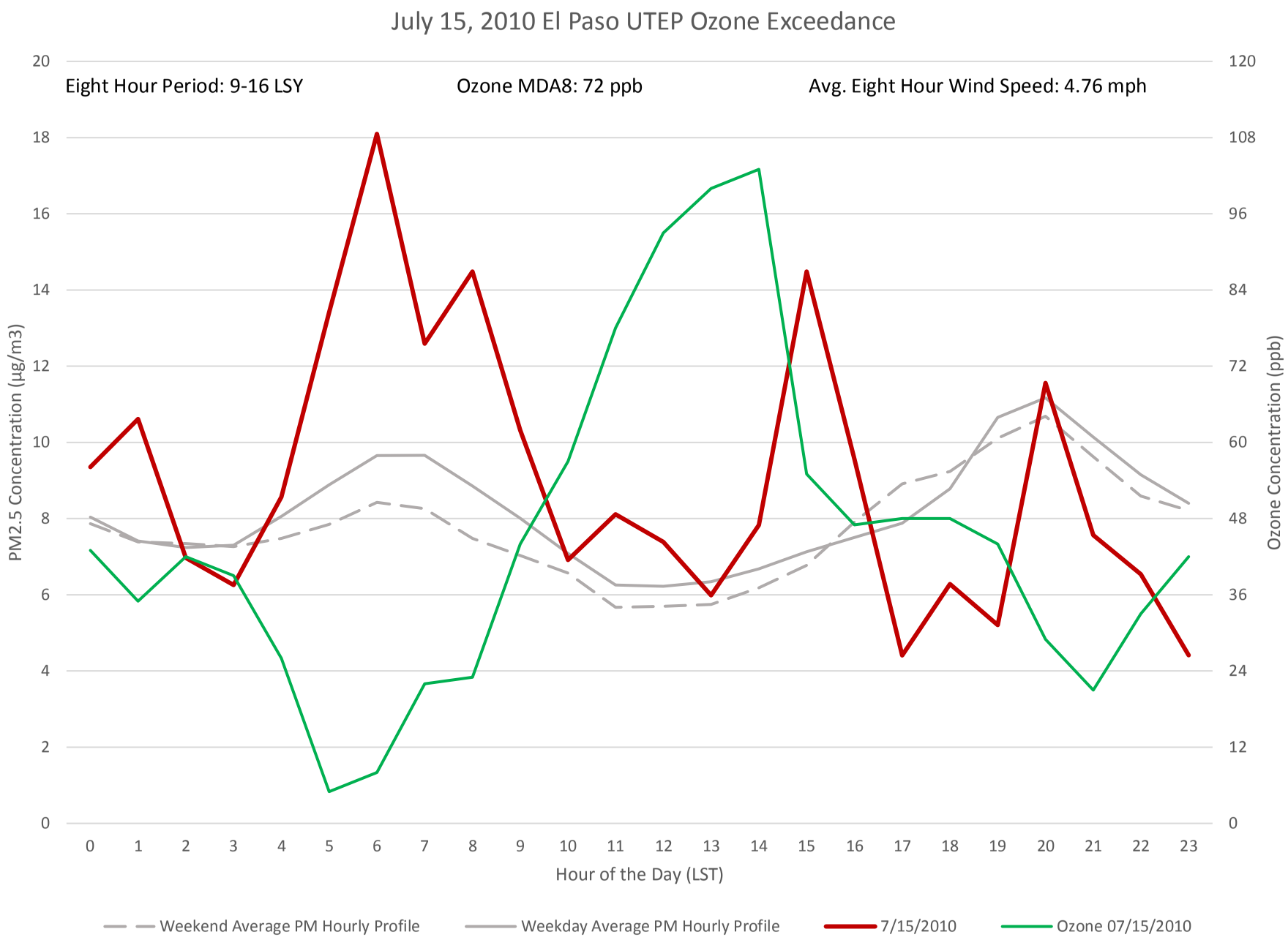

June 22, 2011 El Paso UTEP Ozone Exceedance
Eight Hour Period: 11-18 LST
Ozone MDA8: 78 ppb
Avg. Eight Hour Wind Speed: 2.54 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
6/22/2011
Ozone 06/22/2011

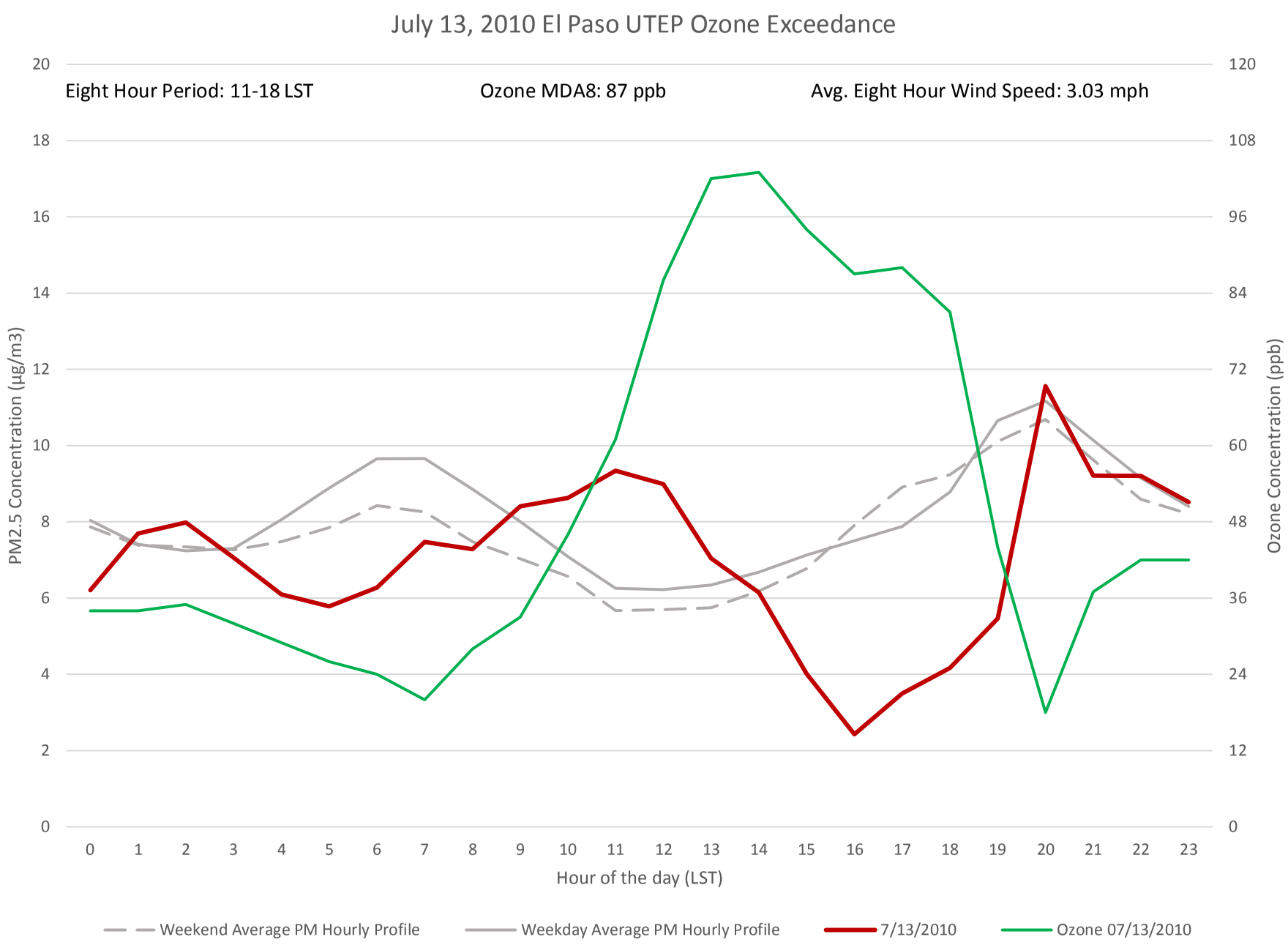

June 4, 2011 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 78 ppb
Avg. Eight Hour Wind Speed: 2.75 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
6/4/2011
Ozone 06/04/2011


August 20, 2010 El Paso UTEP Ozone Exceedance
Eight Hour Period: 11-18 LST
Ozone MDA8: 74 ppb
Avg. Eight Hour Wind Speed: 3.75 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
8/20/2010
Ozone 08/20/2010


August 10, 2010 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 73 ppb
Avg. Eight Hour Wind Speed: 2.48 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
8/10/2010
Ozone 08/10/2010

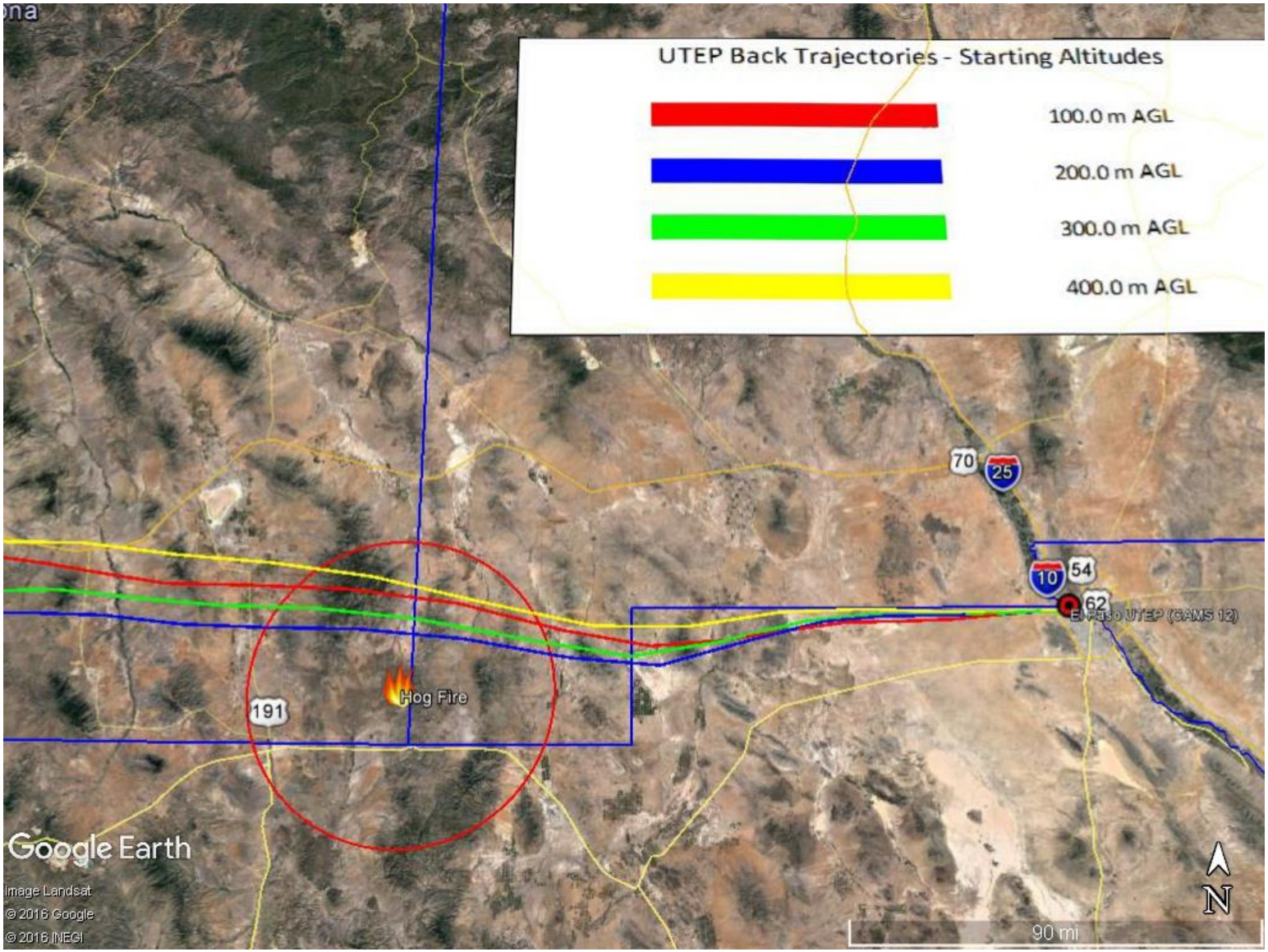

July 19, 2010 El Paso UTEP Ozone Exceedance
Eight Hour Period: 10-17 LST
Ozone MDA8: 81 ppb
Avg. Eight Hour Period Wind Speed: 3.48 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
7/19/2010
Ozone 07/19/2010


July 15, 2010 El Paso UTEP Ozone Exceedance
Eight Hour Period: 9-16 LSY
Ozone MDA8: 72 ppb
Avg. Eight Hour Wind Speed: 4.76 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the Day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
7/15/2010
Ozone 07/15/2010

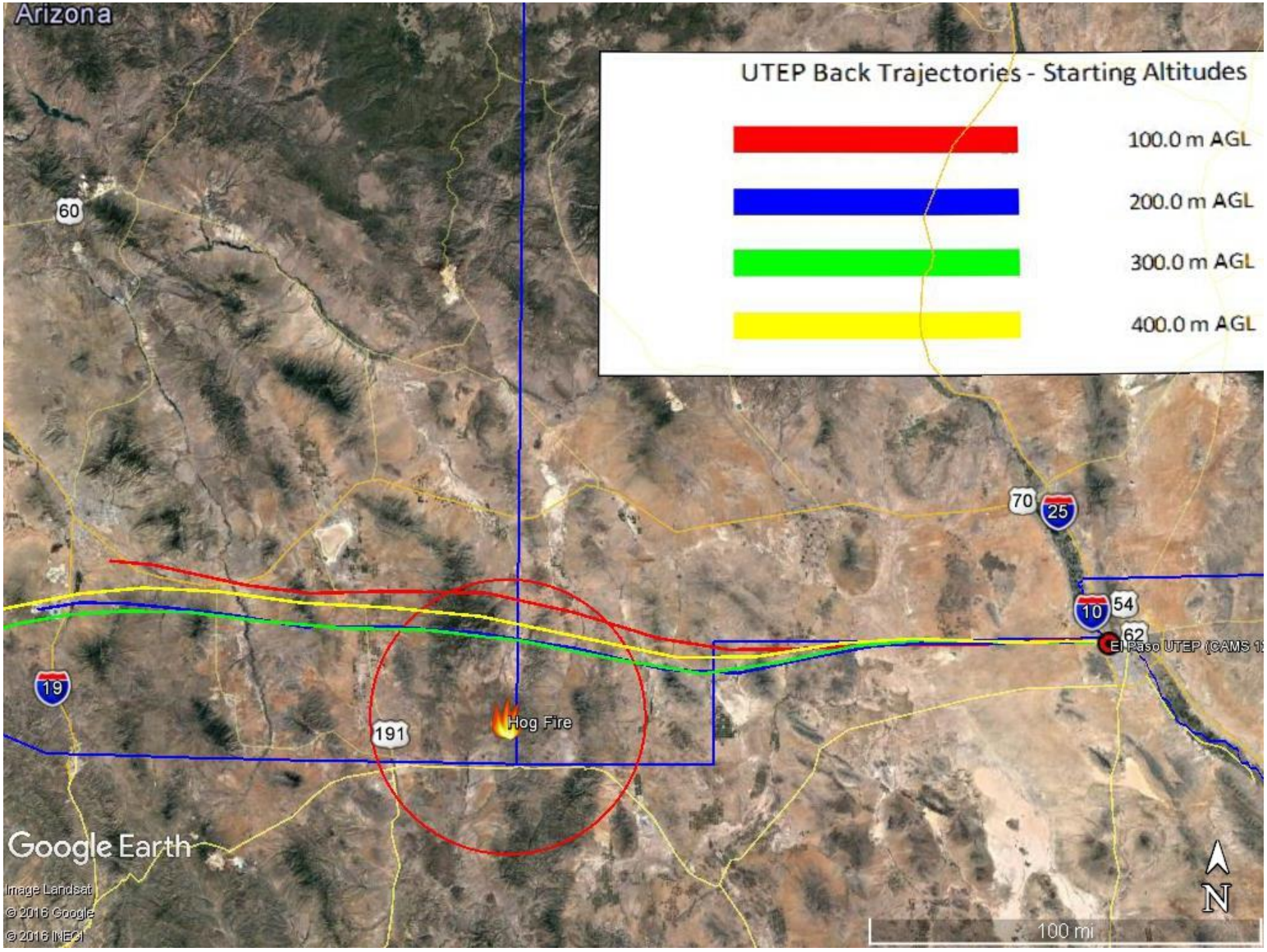

July 13, 2010 El Paso UTEP Ozone Exceedance
Eight Hour Period: 11-18 LST
Ozone MDA8: 87 ppb
Avg. Eight Hour Wind Speed: 3.03 mph
PM2.5 Concentration (µg/m3)
Ozone Concentration (ppb)
Hour of the day (LST)
Weekend Average PM Hourly Profile
Weekday Average PM Hourly Profile
7/13/2010
Ozone 07/13/2010

APPENDIX B: EL PASO UTEP HYSPLIT BACK TRAJECTORIES

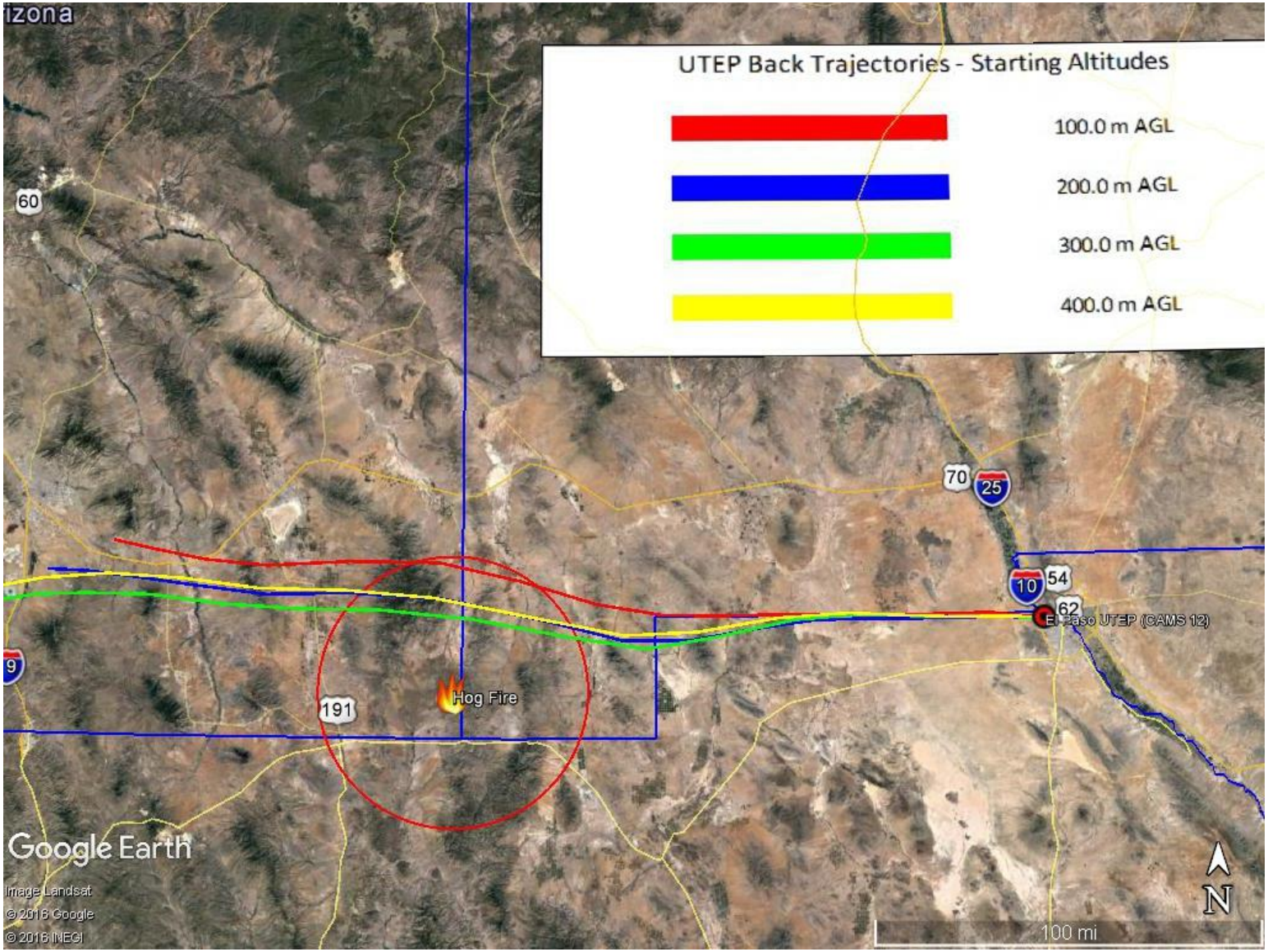
El Paso UTEP (CAMS 12) Back Trajectory 11:00 AM (MST) June 21, 2015



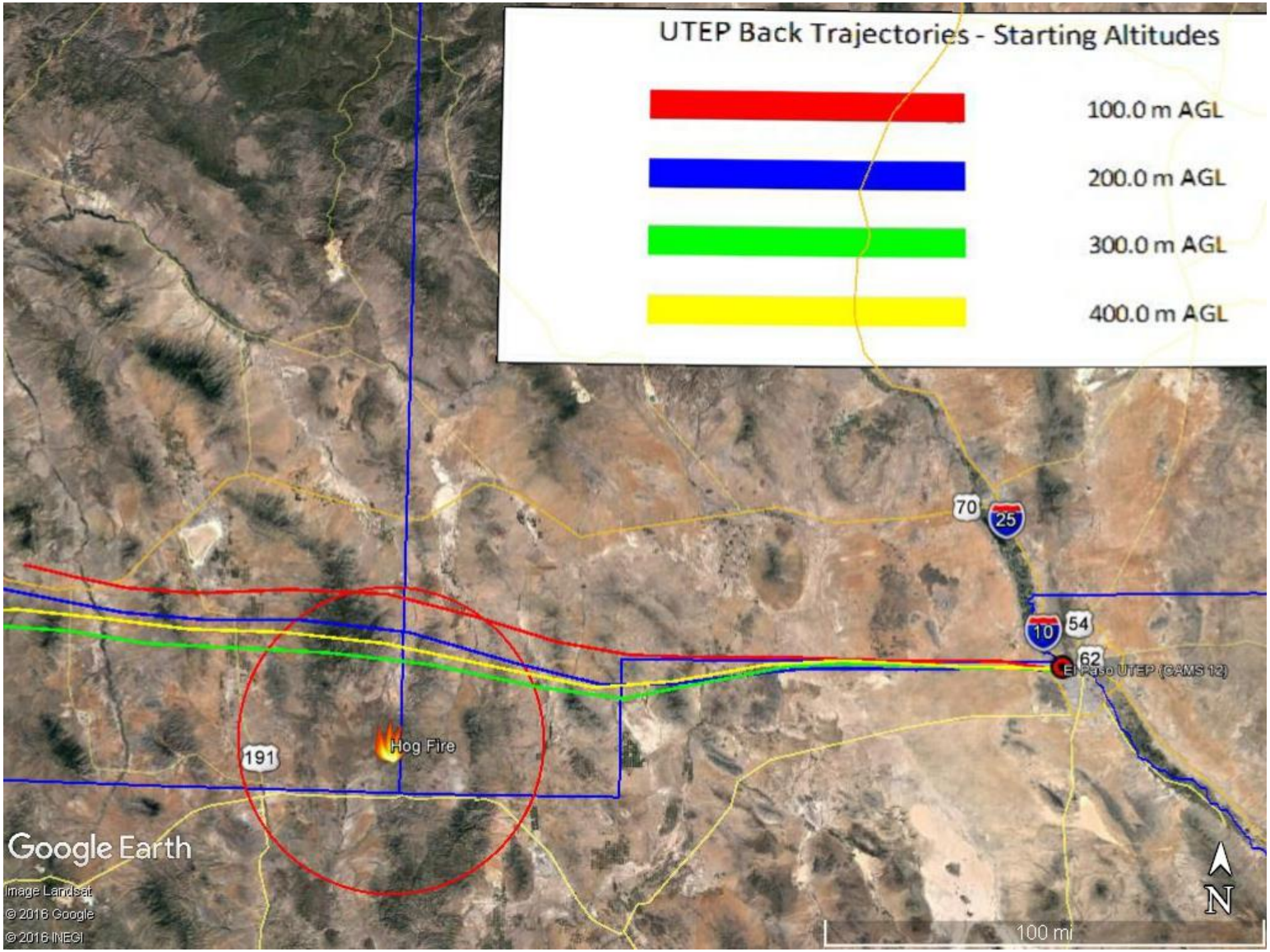
El Paso UTEP (CAMS 12) Back Trajectory 12:00 PM (MST) June 21, 2015



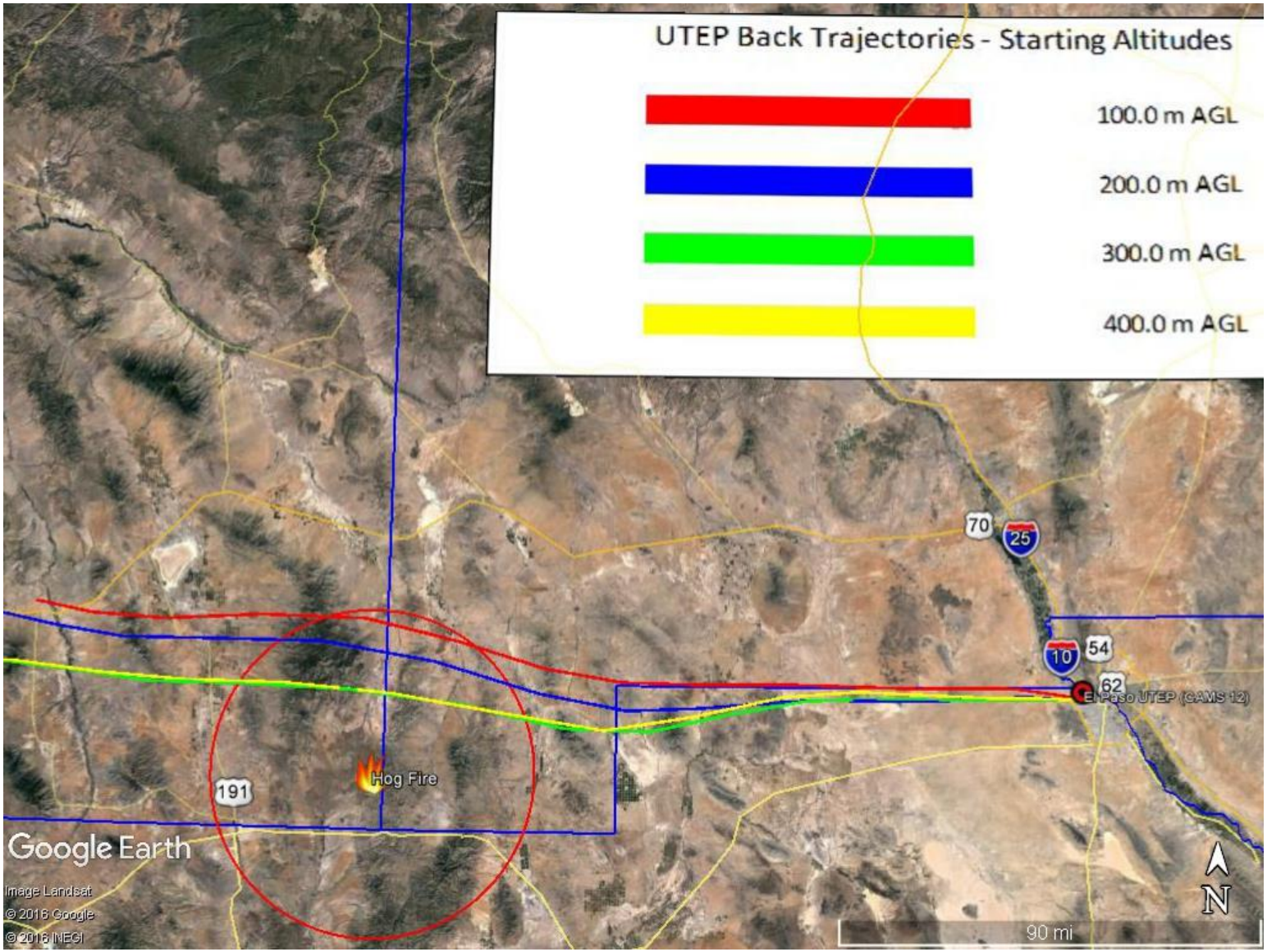
El Paso UTEP (CAMS 12) Back Trajectory 12:30 PM (MST) June 21, 2015



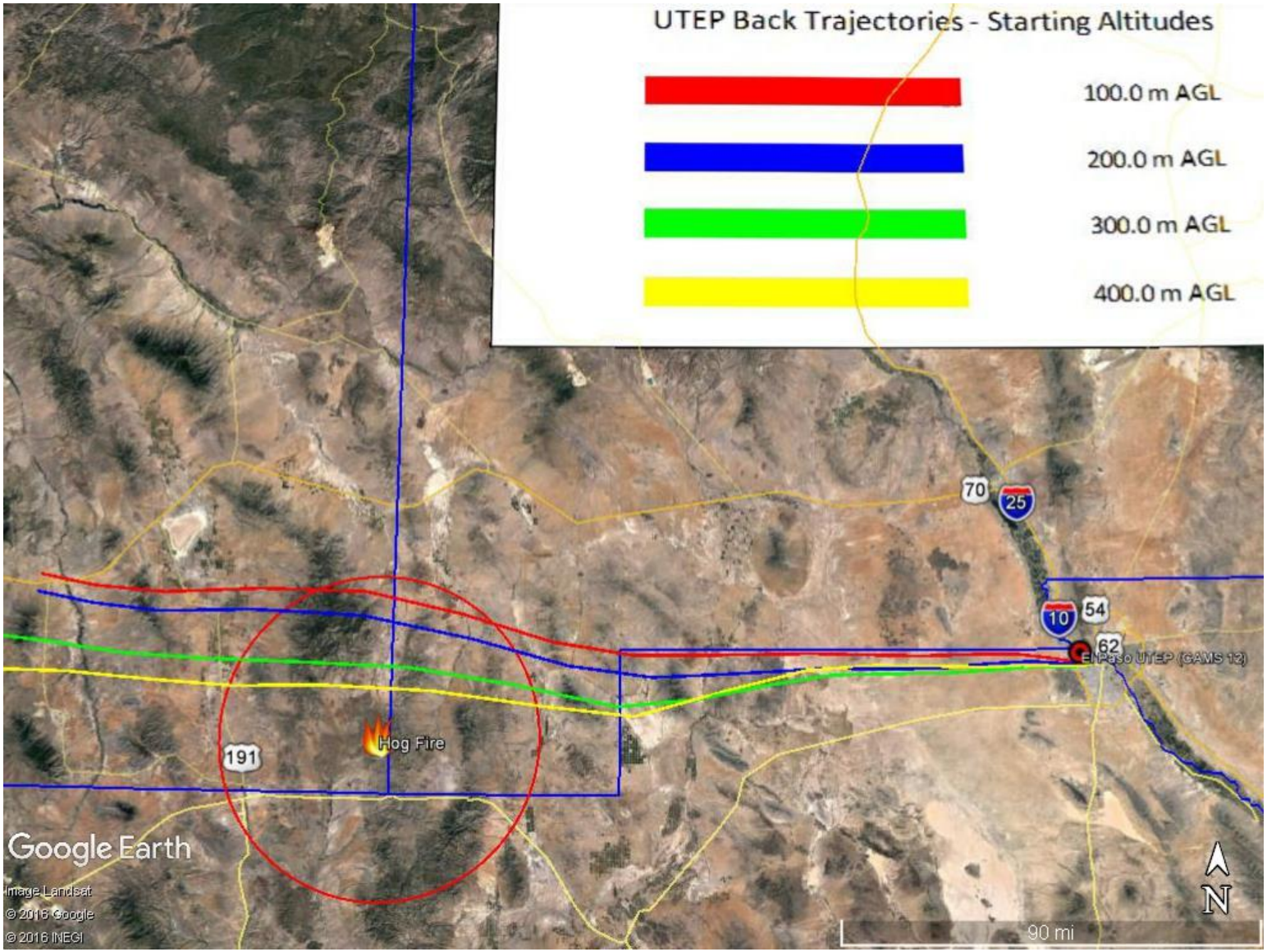
El Paso UTEP (CAMS 12) Back Trajectory 13:00 PM (MST) June 21, 2015



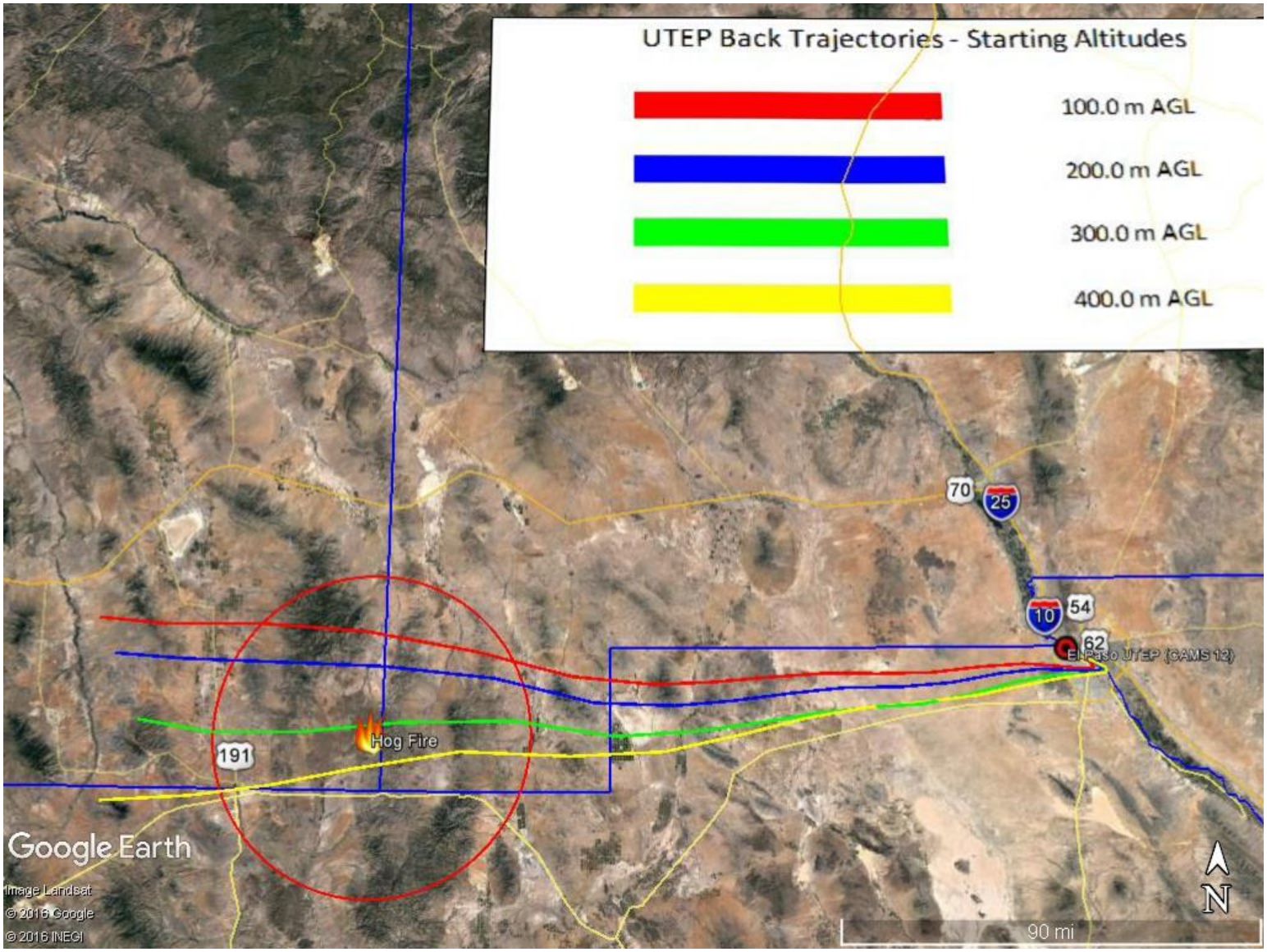
El Paso UTEP (CAMS 12) Back Trajectory 13:30 PM (MST) June 21, 2015



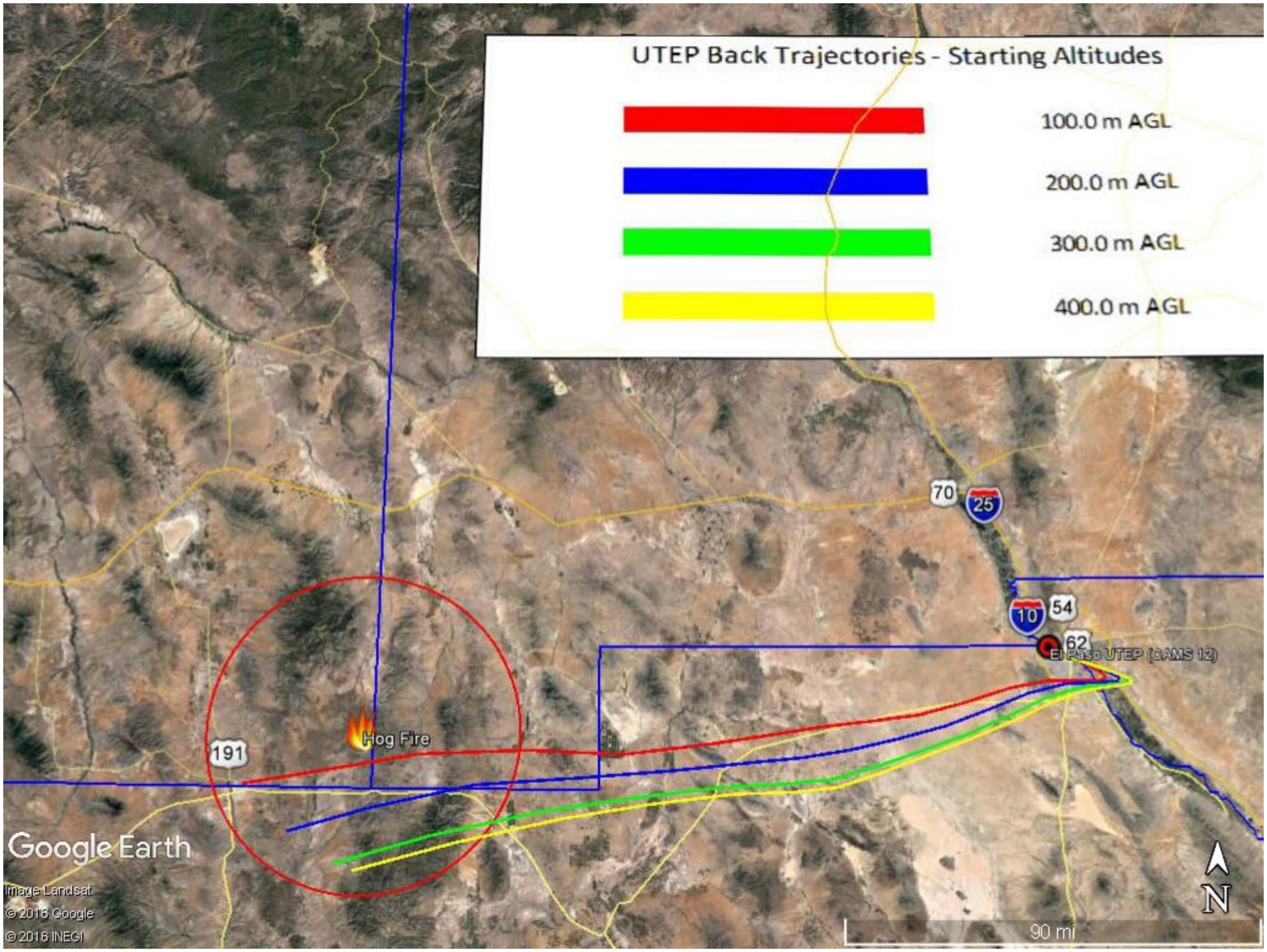
El Paso UTEP (CAMS 12) Back Trajectory 14:00 PM (MST) June 21, 2015



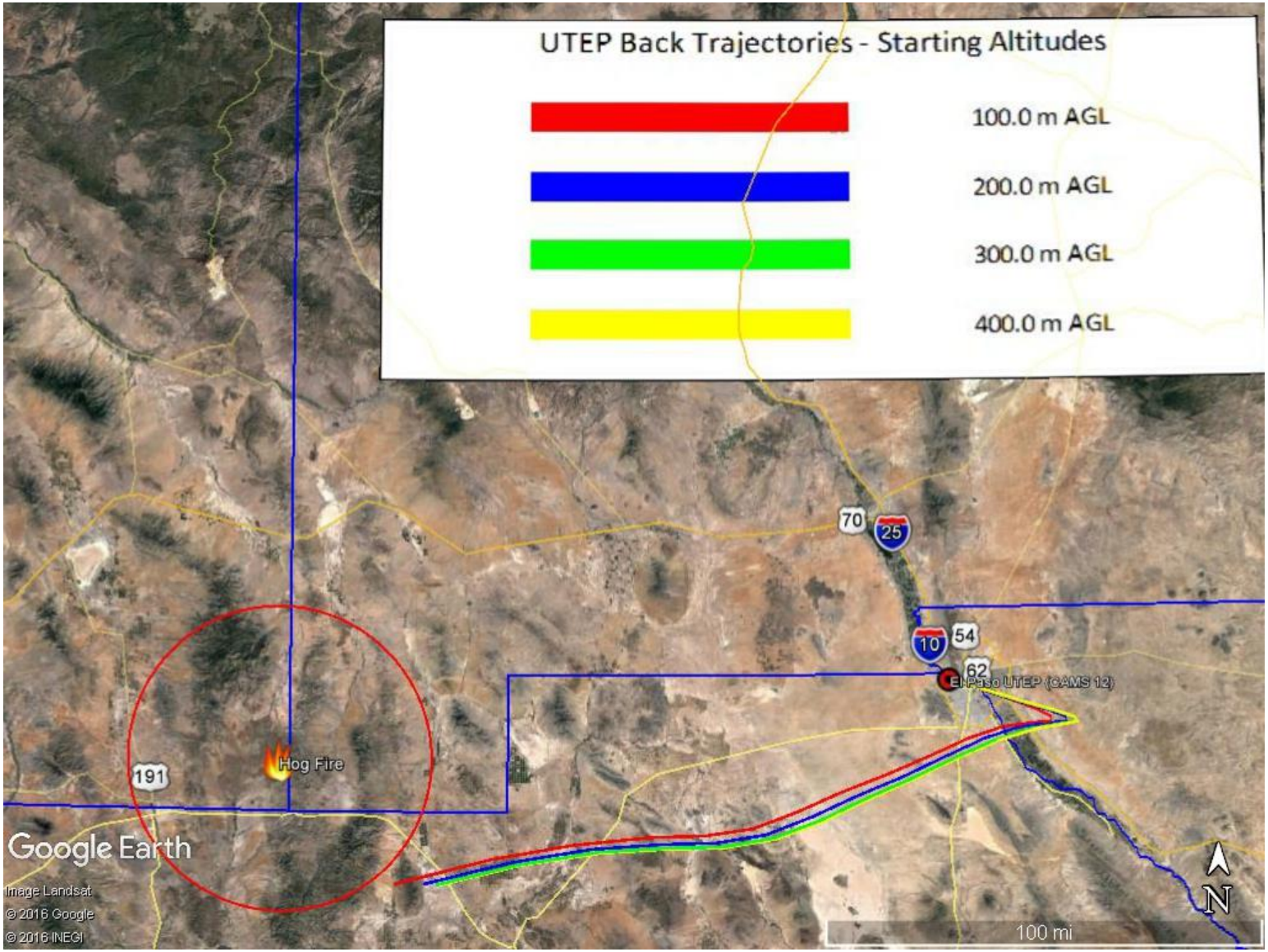
El Paso UTEP (CAMS 12) Back Trajectory 15:00 PM (MST) June 21, 2015



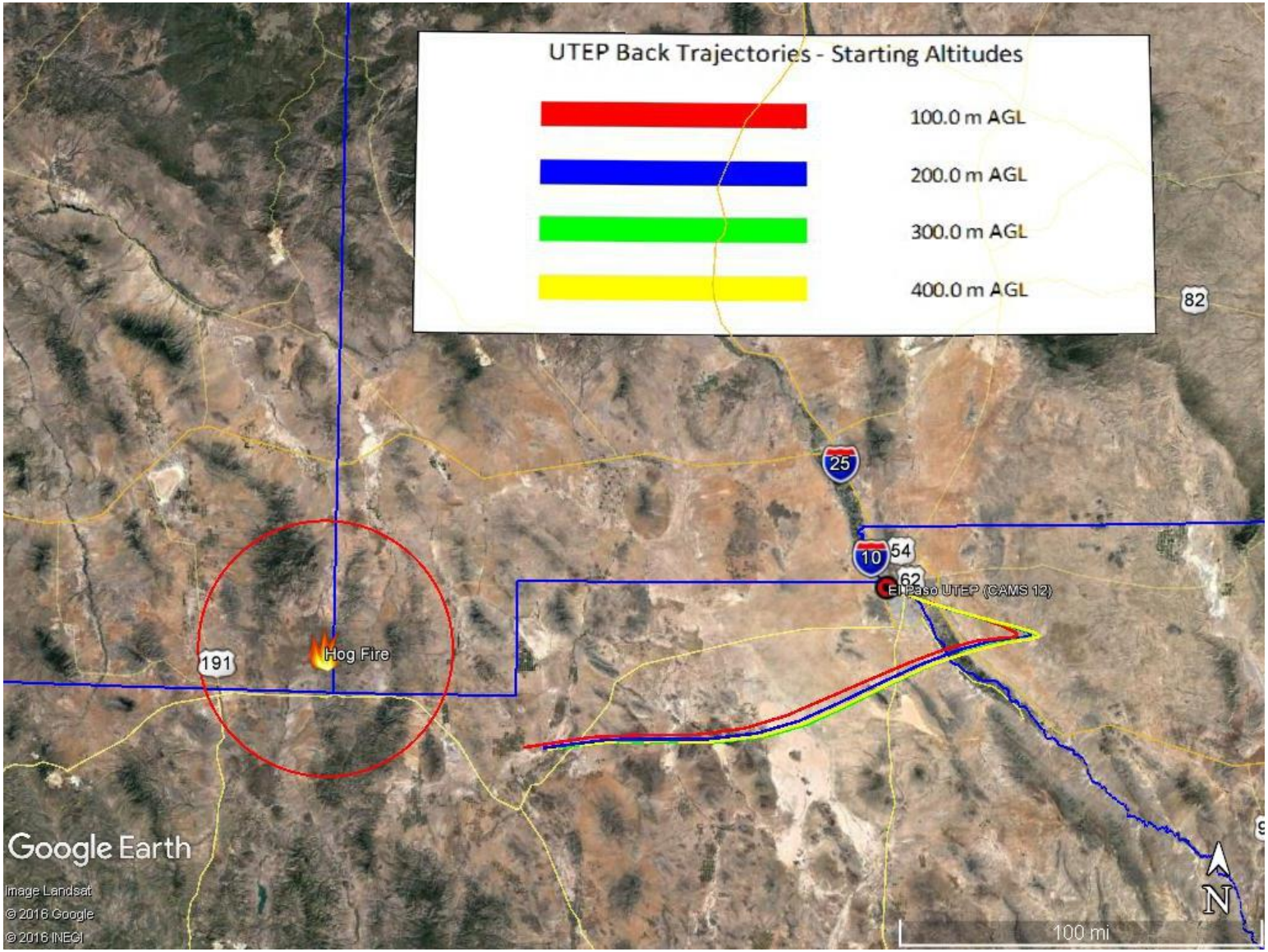
El Paso UTEP (CAMS 12) Back Trajectory 16:00 PM (MST) June 21, 2015



El Paso UTEP (CAMS 12) Back Trajectory 17:00 PM (MST) June 21, 2015

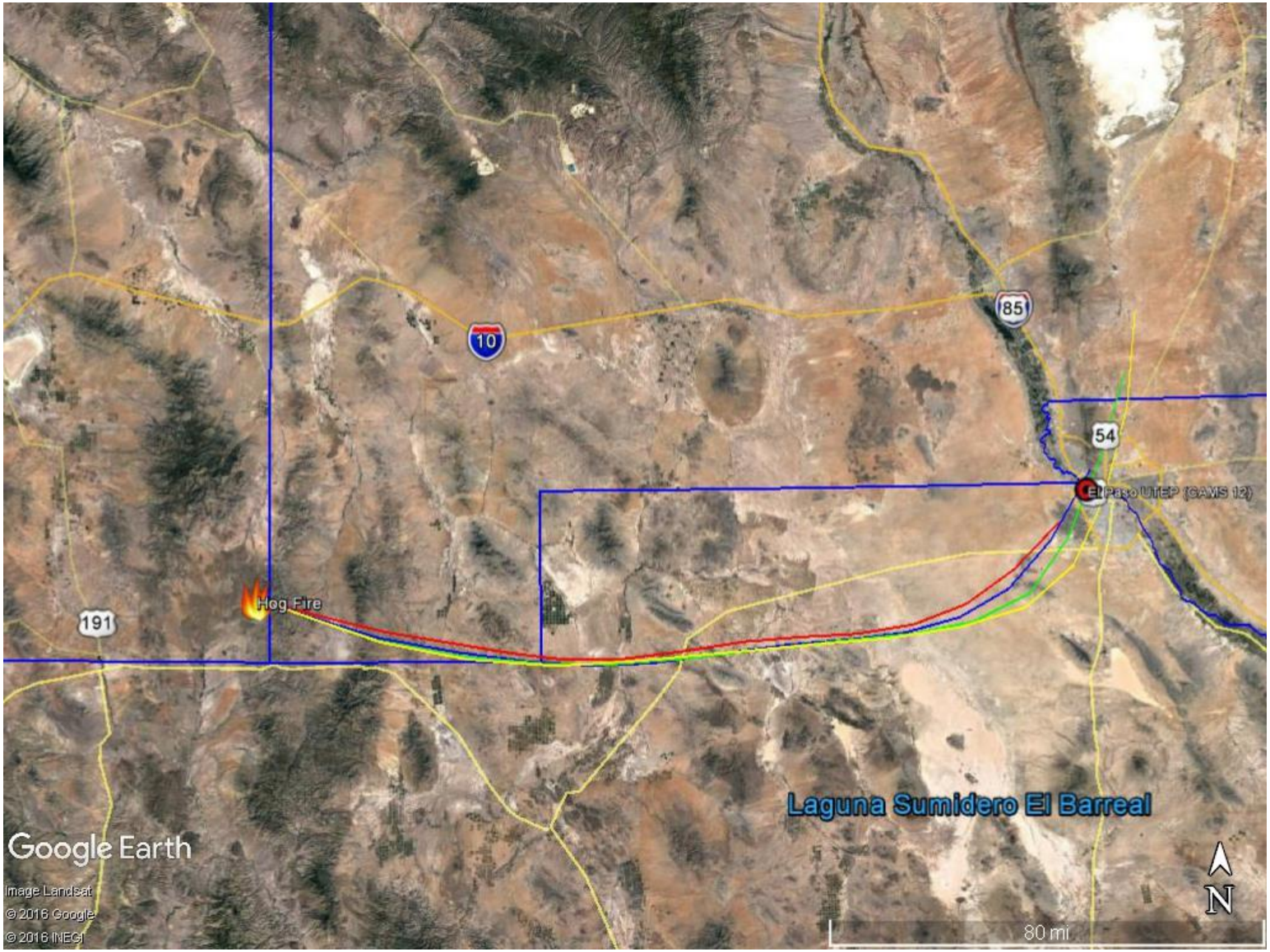


El Paso UTEP (CAMS 12) Back Trajectory 18:00 PM (MST) June 21, 2015

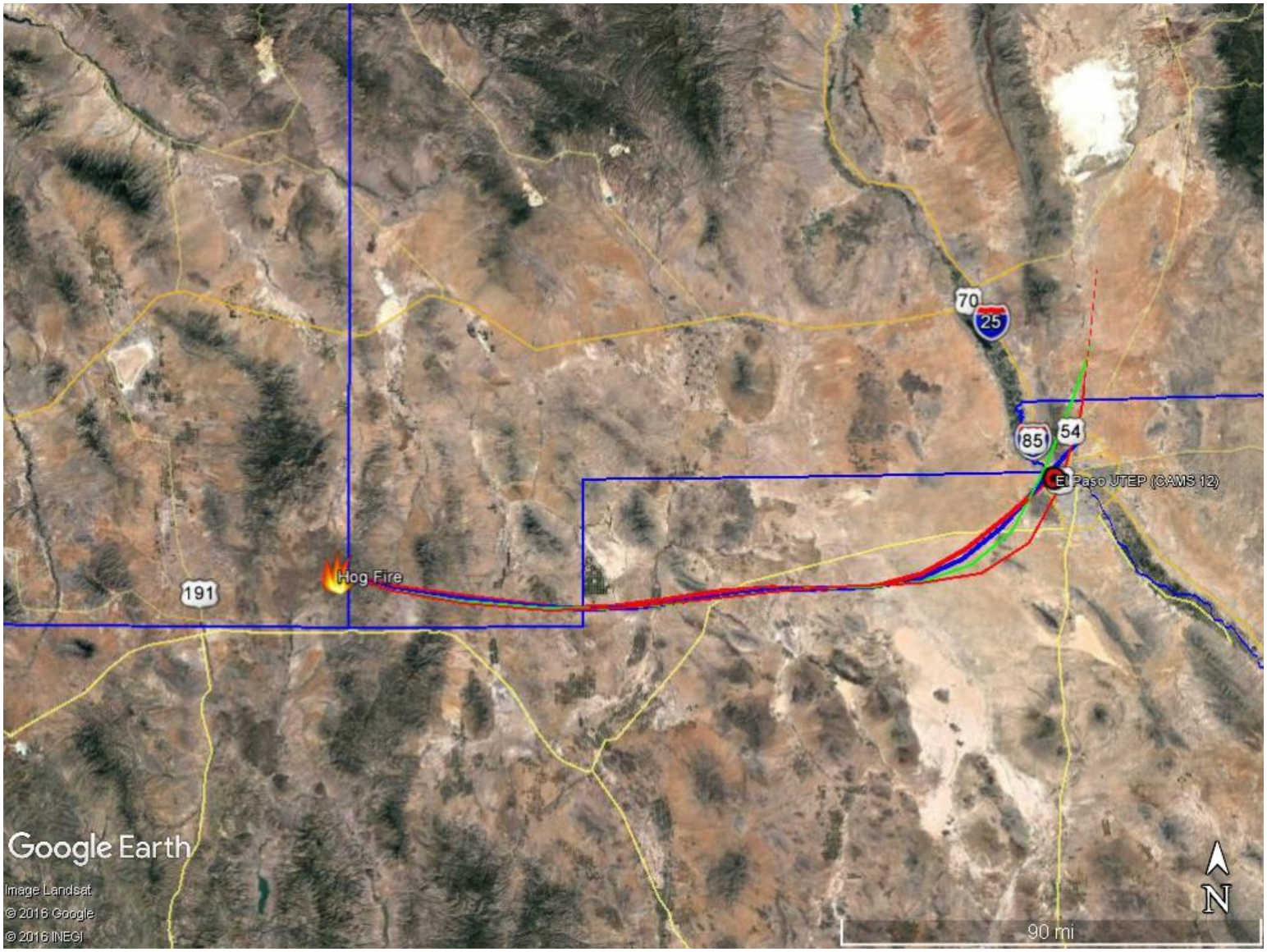


APPENDIX C: HOG FIRE FORWARD HYSPLIT TRAJECTORIES

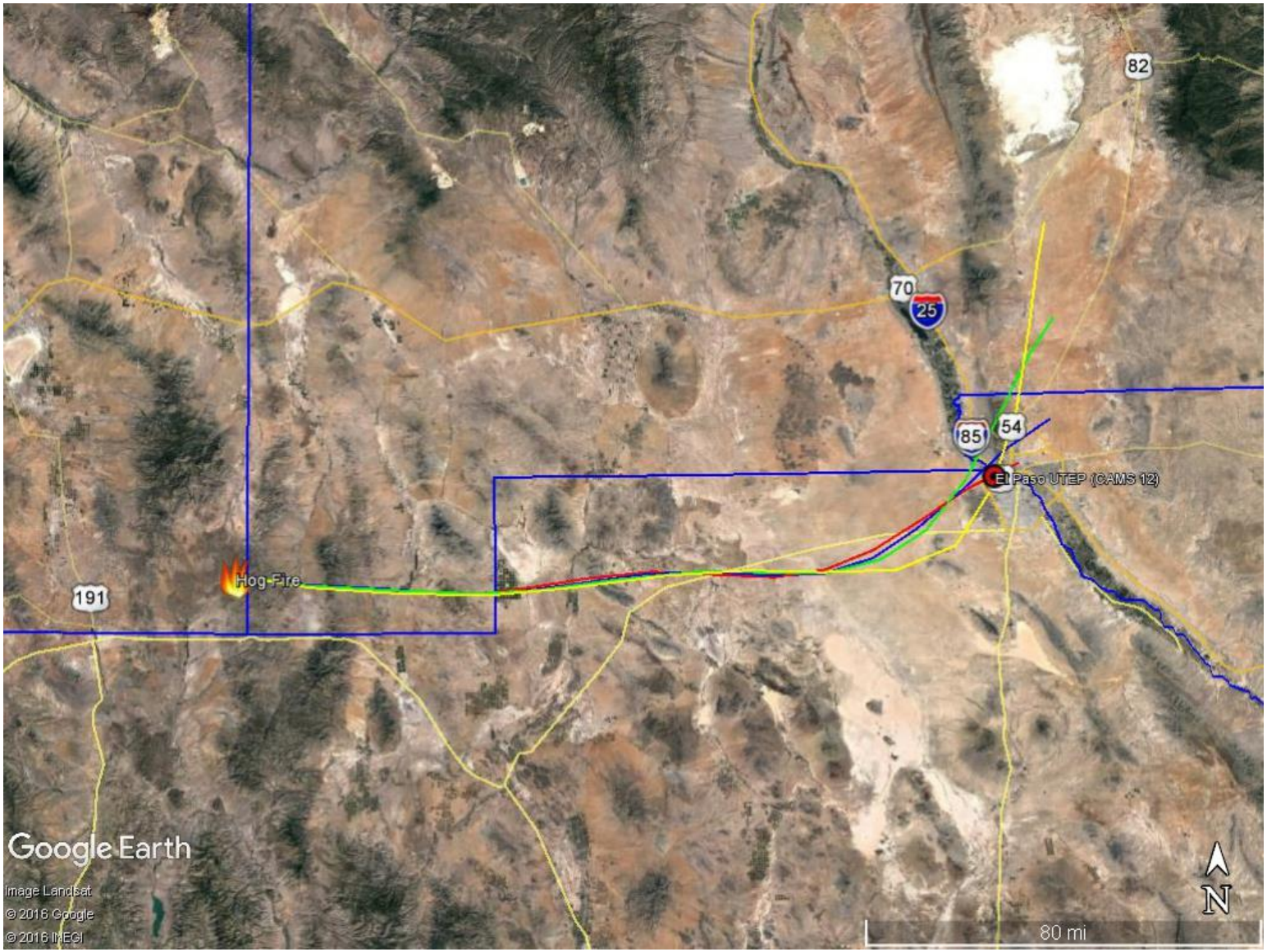
Hog Fire Forward Trajectories 11:00 PM (MST) June 20, 2015



Hog Fire Forward Trajectories 12:00 AM (MST) June 21, 2015

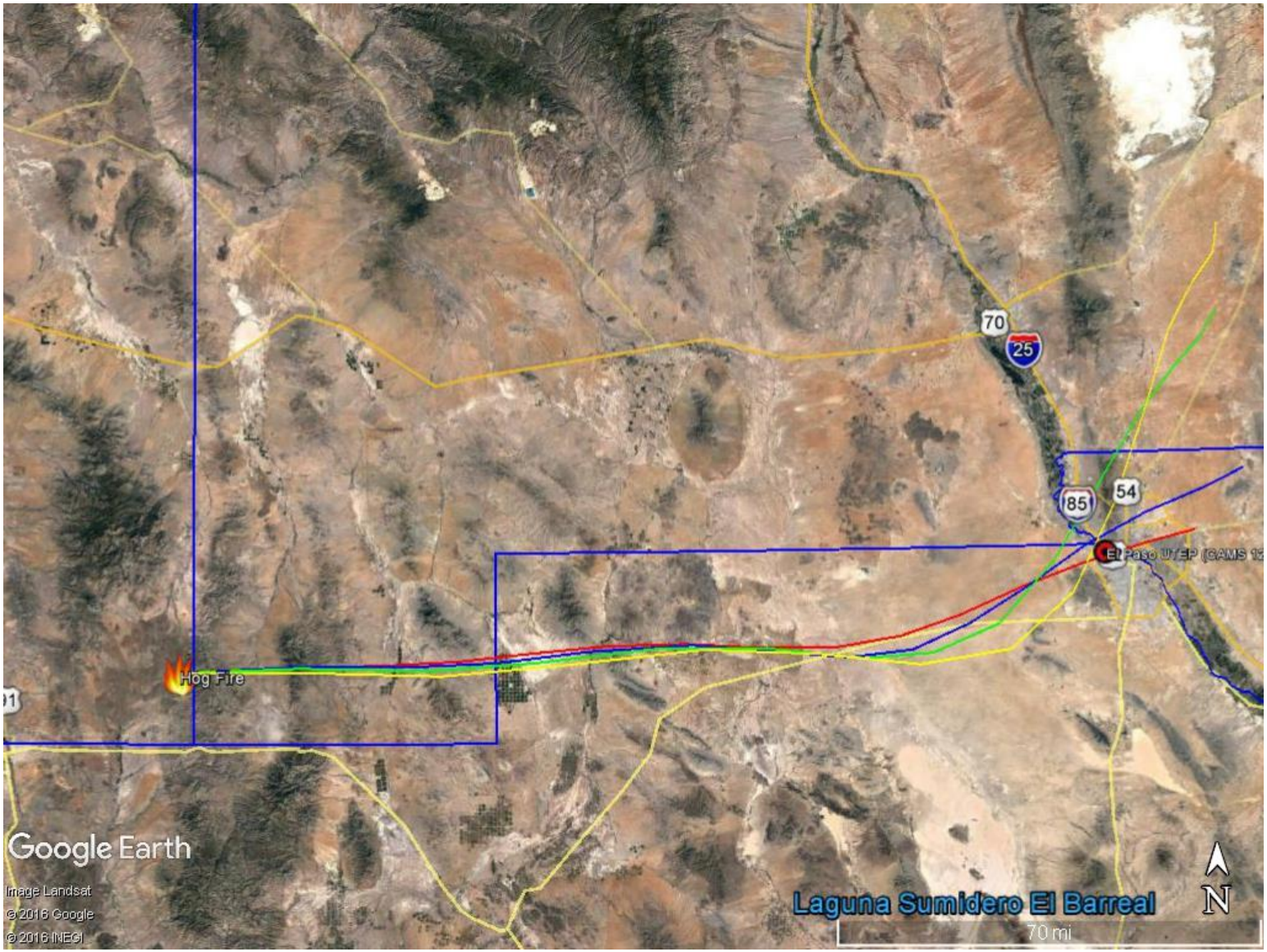


Hog Fire Forward Trajectories 01:00 AM (MST) June 21, 2015



Hog Fire Forward Trajectories 02:00 AM (MST) June 21, 2015

Hog Fire Forward Trajectories 03:00 AM (MST) June 21, 2015

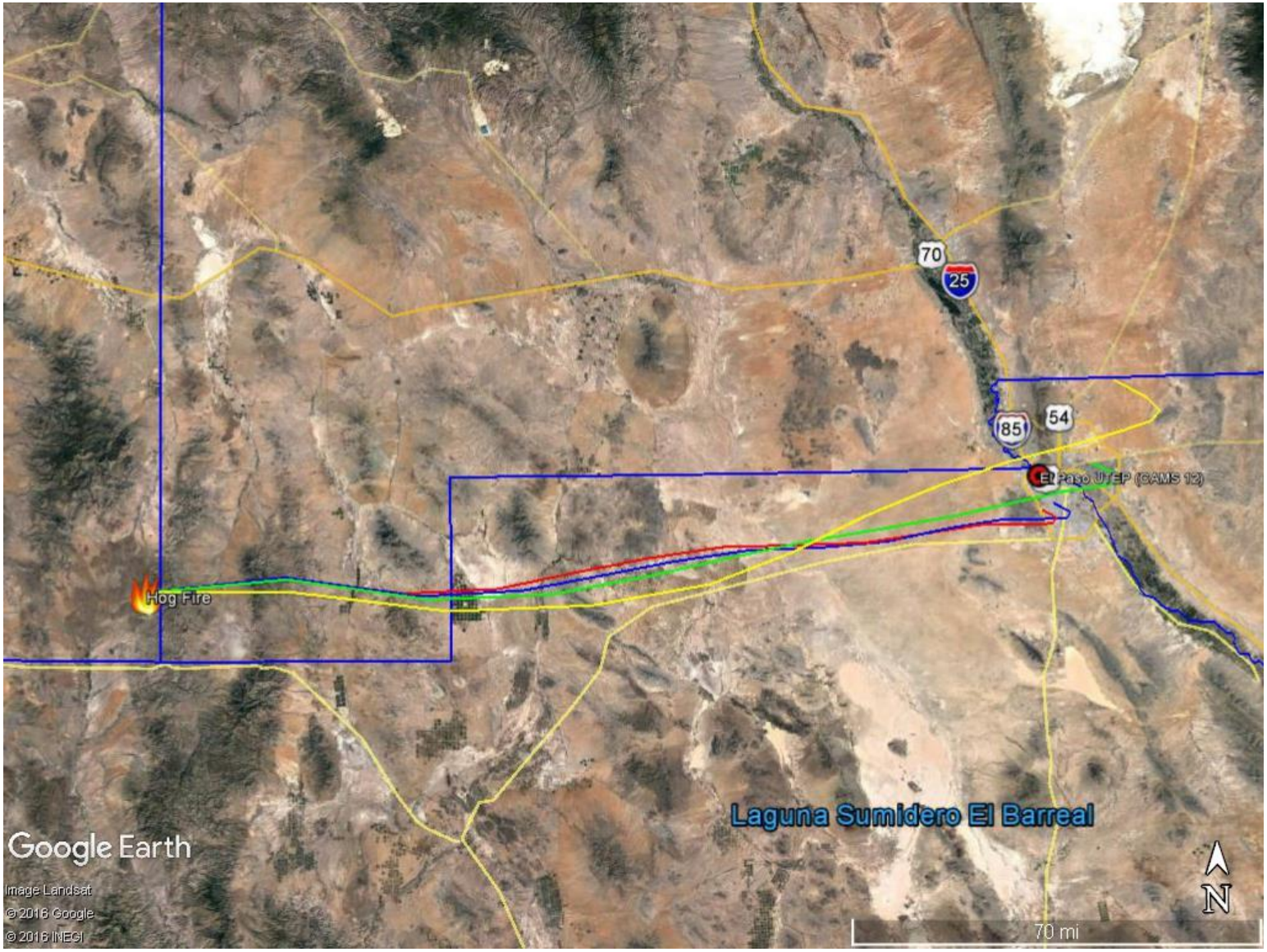


Hog Fire Forward Trajectories 05:00 AM (MST) June 21, 2015

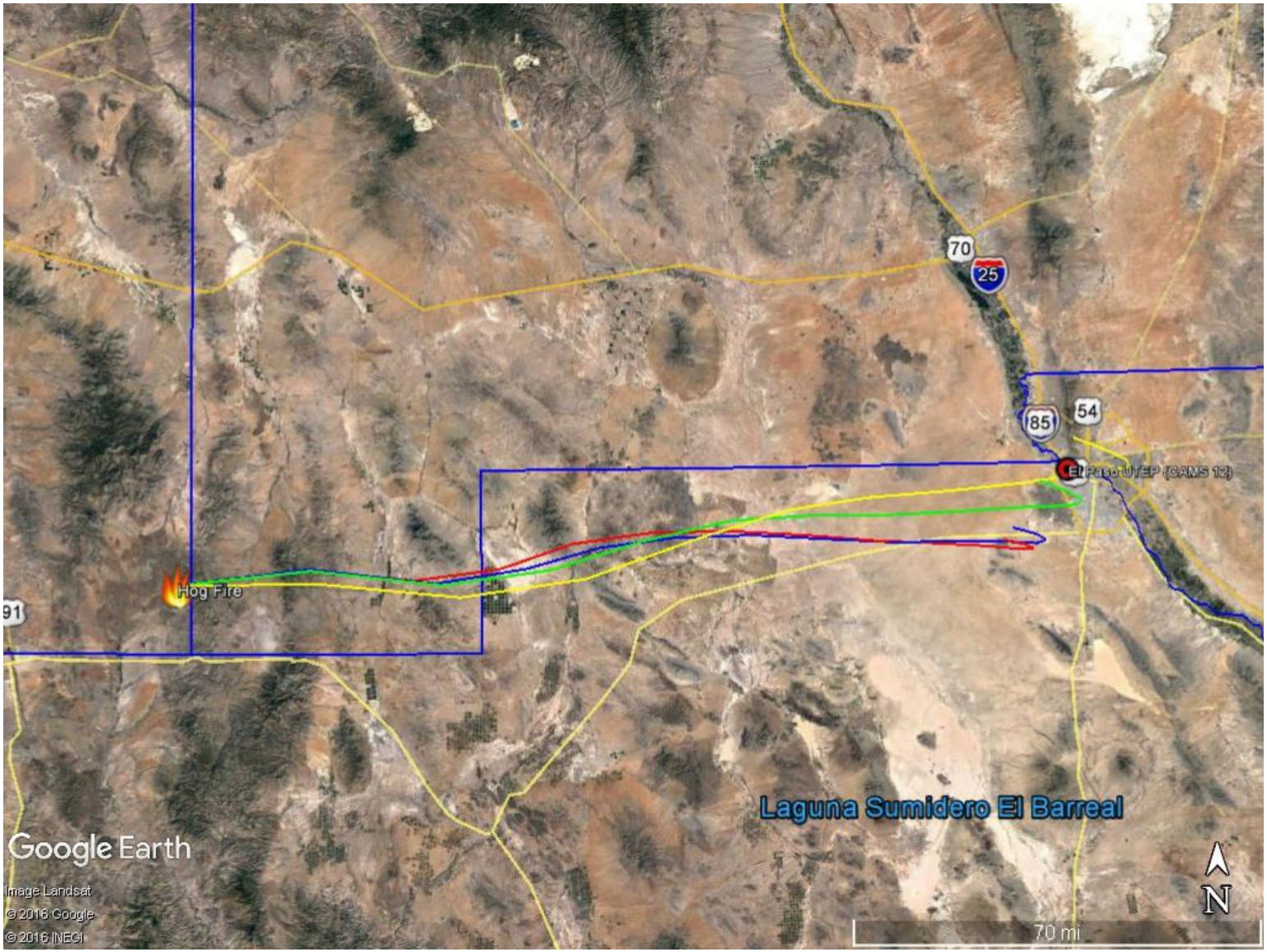
Hog Fire Forward Trajectories 04:00 AM (MST) June 21, 2015

Hog Fire Forward Trajectories 06:00 AM (MST) June 21, 2015

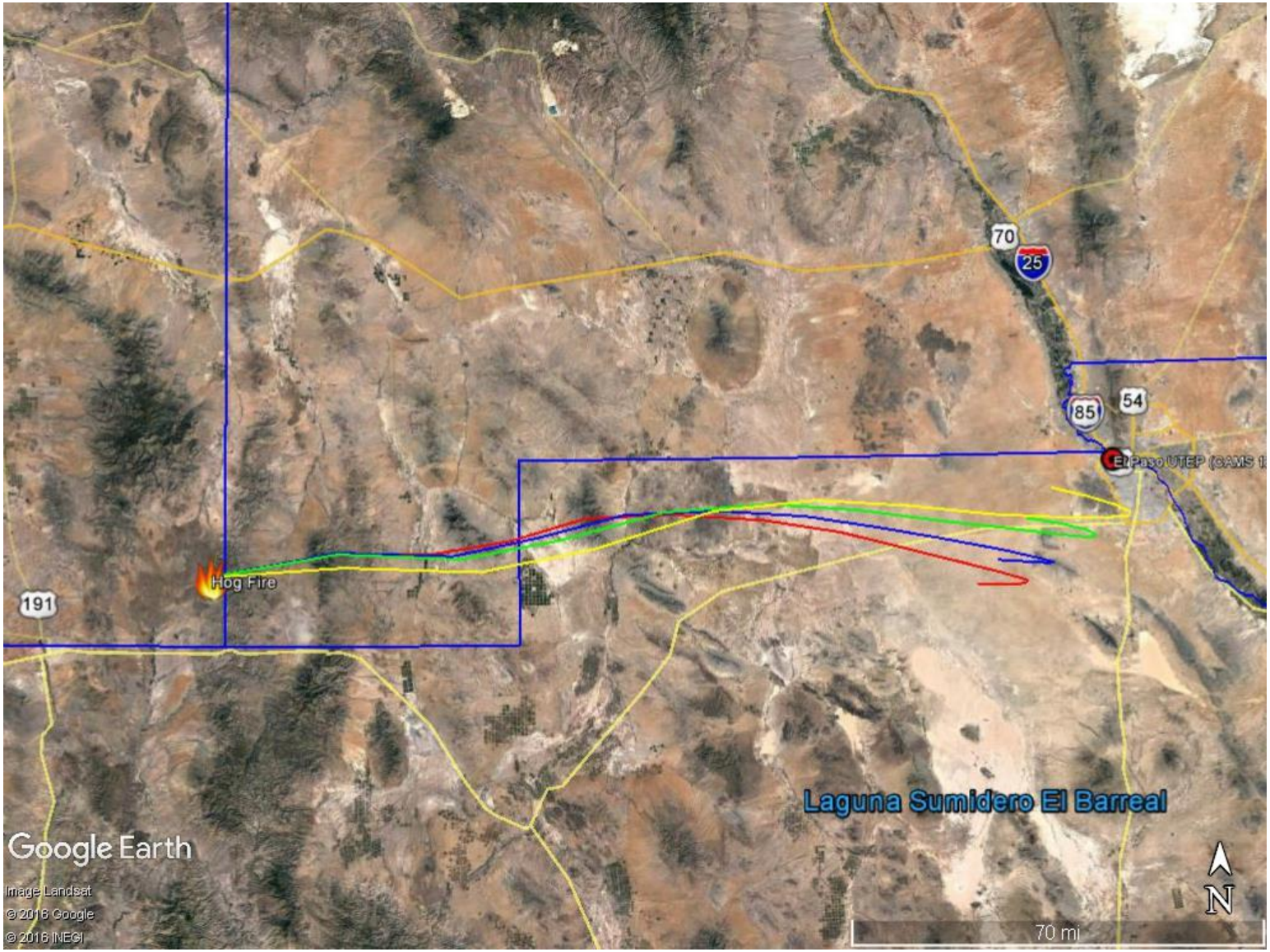
Hog Fire Forward Trajectories 07:00 AM (MST) June 21, 2015



Hog Fire Forward Trajectories 08:00 AM (MST) June 21, 2015

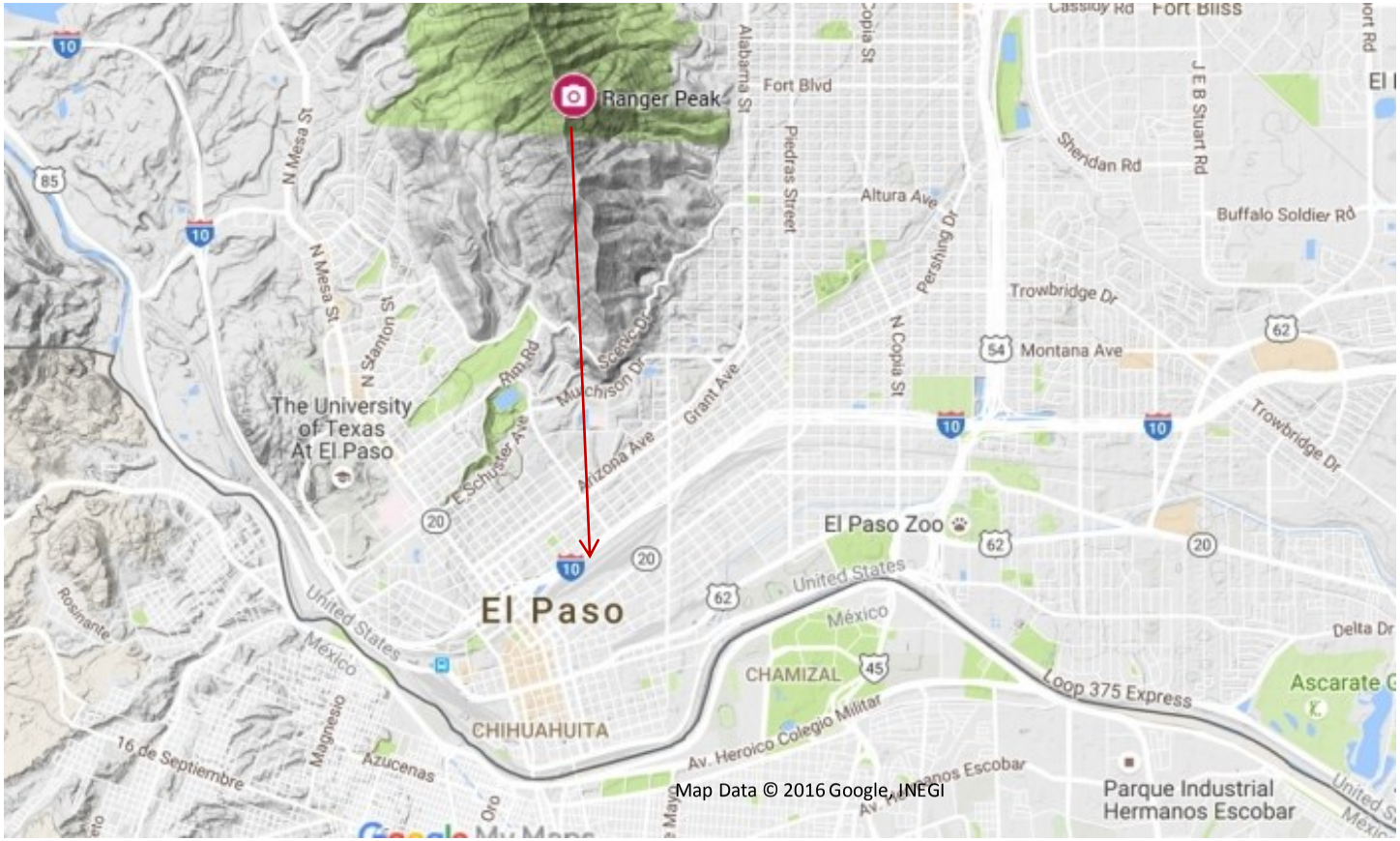


Hog Fire Forward Trajectories 09:00 AM (MST) June 21, 2015



Hog Fire Forward Trajectories 10:00 AM (MST) June 21, 2015

APPENDIX D: RANGER PEAK CAMERA IMAGERY



Map of Central El Paso showing Ranger Peak and the Web Camera's Line of Sight

Ranger Peak: June 17, 2015 (1:48 PM) El Paso UTEP (CAMS 12) Ozone Maximum Daily Average: 81 ppb

Ranger Peak: June 18, 2015 (1:47 PM) El Paso UTEP (CAMS 12) Ozone Maximum Daily Average: 68 ppb

Ranger Peak: June 19, 2015 (1:47 PM) El Paso UTEP (CAMS 12) Ozone Maximum Daily Average: 60 ppb

Ranger Peak: June 20, 2015 (1:47 PM) El Paso UTEP (CAMS 12) Ozone Maximum Daily Average: 67 ppb

Ranger Peak: June 21, 2015 (1:46 PM) El Paso UTEP (CAMS 12) Ozone Maximum Daily Average: 77 ppb

Ranger Peak: June 22, 2015 (1:47 PM) El Paso UTEP (CAMS 12) Ozone Maximum Daily Average: 56 ppb

Ranger Peak: June 29, 2015 (1:17 PM) El Paso UTEP (CAMS 12) Ozone Maximum Daily Average: 72 ppb

Ranger Peak: August 10, 2015 (1:47 PM) El Paso UTEP (CAMS 12) Ozone Maximum Daily Average: 74 ppb

APPENDIX E: PUBLIC COMMENTS

JOSÉ RODRÍGUEZ
STATE SENATOR
SENATE DISTRICT 29
EL PASO, CULBERSON, HUDSPETH, PRESIDIO & JEFF DAVIS COUNTIES

September 22, 2016

Via electronic mail to amda@tceq.texas.gov

RE: TCEQ Proposed Ozone Exceptional Event Demonstration
El Paso UTEP Monitor, June 21, 2015 8-hour Ozone Reading

To Mr. David Brymer, Director, Air Quality Division:

Please accept this letter supporting the Texas Commission on Environmental Quality's (TCEQ) Demonstration Document for a June 21, 2015 Exceptional Event at the El Paso University of Texas at El Paso (UTEP) (CAMS 12) Monitoring Site.

For reasons set forth in the Demonstration Document, the El Paso area should not receive a non-attainment designation based on data collected in August 2015 at the UTEP monitoring site. The site's measured ozone concentration of 77 parts per billion (ppb) is attributable to pollutants, which were transported to El Paso from wildfires in southwestern New Mexico and eastern Arizona. These pollutants raised ozone levels at the site beyond what they would otherwise have been and contributed to the El Paso area exceeding ozone concentration standards by less than 1 ppb.

The El Paso area should not be punished for what TCEQ has shown is an exceptional circumstance that El Paso could not control, and that has since dissipated. Maintaining attainment status is vitally important to El Paso and its ability to keep and recruit industry. The federal mandates that result from a non-attainment designation, as well as the stigma that non-attainment status carries, would dissuade businesses from making further investments in our region.

Over the years, our community has made significant strides to ensure that our environment is healthy to our residents. As the record demonstrates, aside from one-time weather or disaster events, El Paso has been in attainment.

CAPITOL OFFICE
ROOM E1.610
P.O. BOX 12068
AUSTIN, TEXAS 78711
(512) 463-0129
(512) 463-7100 FAX

EL PASO OFFICE
100 N. OCHOA ST., SUITE A
EL PASO, TEXAS 79901
(915) 351-3500
(915) 351-3579 FAX

MISSION VALLEY OFFICE
206 S.E. 8TH ST., SUITE 201
FABENS, TEXAS 79838
(915) 765-2000
(915) 764-1555 FAX

MARFA OFFICE
300 W. COLUMBIA, ROOM 102
ELEMENTARY BLDG.
P.O. BOX 1105
MARFA, TEXAS 79843
(432) 729-4800
(432) 729-4803 FAX

For the forgoing, I support the TCEQ Demonstration Document and would encourage the Environmental Protection Agency to accept its conclusions. Should you have any questions, please contact my Capitol office at (512) 463-0129.

Sincerely,

José Rodríguez

CÉSAR J. BLANCO
Texas State Representative ◊ District 76

September 23, 2016

Via electronic mail to amda@tceq.texas.gov
Attn: To Mr. David Brymer, Director, Air Quality Division

RE: TCEQ Proposed Ozone Exceptional Event Demonstration
El Paso UTEP Monitor, June 21, 2015 8-hour Ozone Reading

Dear Mr. Brymer,

I am writing in support of the Texas Commission on Environmental Quality's (TCEQ) Demonstration document for a June 21, 2015 Exceptional Event at the University of Texas at El Paso (UTEP) (CAMS 12) Monitoring Site.

The exceptional events demonstration is extremely important for our community. El Paso has unique challenges related to air quality. These challenges include the seasonal effects of the winds that bring pollutants into the area and out-of-state emissions from our neighboring city of Ciudad Juarez, Mexico, which shares significant responsibility for the measured ozone levels in El Paso.

If we are not granted the exceptional event by the Environmental Protection Agency (EPA), the potential impact to our local economy will be devastating. The federal mandates that result from a non- attainment designation, as well as the stigma that non-attainment status carries, would undoubtedly affect our ability to maintain and attract industry and business ventures in our region. A nonattainment designation also imposes significant costs on local industry, which in turn increases the costs of living.

As you can imagine, maintaining attainment status is crucial to El Paso in order to keep the economy of the city and of the state in good shape. Therefore, I strongly support the TCEQ Demonstration Document and encourage the EPA to accept its conclusions. Please do not hesitate to contact my office at (915) 599-9807 should you have any comments or concerns.

Sincerely,

César J. Blanco
State Representative, HD 76

Capitol Office ◊ P.O. Box 2910 ◊ Austin, Texas 78768 ◊ (512) 463-0622 ◊ Fax (512) 463-0931
District Office ◊ 9440 Viscount, Ste. 205 ◊ El Paso, Texas 79925 ◊ (915) 599-9807 ◊ Fax (915) 599-9776

MARISA MÁRQUEZ

STATE REPRESENTATIVE • DISTRICT 77

September 23, 2016

Dear Sir or Madam:

As Texas State Representative for District 77 in El Paso, TX, I am writing in support of the Texas Commission on Environmental Quality's (TCEQ's) Proposed Exceptional Events Demonstration for the El Paso UTEP monitor ozone reading on June 21, 2015.

At this time, El Paso is marginally above the standard set by the U.S. Environmental Protection Agency (EPA) for ground-level ozone concentrations. Some contributing factors to this current ozone level include El Paso's proximity to the Mexico border, as well as the state of New Mexico. Although out-of-state emissions contribute significantly to the measured ozone levels, such emissions from outside of Texas cannot be reduced by El Paso or the TCEQ. Despite the increase, El Paso remains within levels deemed safe by the EPA in 2008, and the TCEQ has determined there is no threat to public health.

A nonattainment designation would have a negative impact on the El Paso economy, and would impose substantial costs on local businesses; necessities such as gasoline and electricity will in turn become more expensive for the El Paso community.

I urge you to consider the TCEQ results which suggest that wildfires in Arizona, and New Mexico, contributed significantly to the elevated ozone levels detected at the UTEP monitor on June 21, 2015. Therefore, El Paso qualifies for the TCEQ's Proposed Exceptional Events Demonstration.

Thank you for your consideration of this request. If you have any questions, please feel free to contact my office at (915) 532-2755.

Sincerely,

Marisa Márquez

Marisa Márquez
State Representative, District 77
Texas House of Representatives

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GEANIE W. MORRISON

COMMITTEES:
ENVIRONMENTAL REGULATION - CHAIR
HIGHER EDUCATION

DISTRICT 30
COUNTIES:
ARANSAS
CALHOUN
DEWITT
GOLIAD
REFUGIO
VICTORIA

September 22, 2016

By electronic mail: amda@tceq.texas.gov

Re: TCEQ Proposed Ozone Exceptional Event Demonstration
El Paso UTEP Monitor, June 21, 2015 8-hour Ozone Reading

Dear Sir or Madam:

I appreciate the opportunity to file these comments on the TCEQ's proposed exceptional events demonstration for the El Paso UTEP monitor ozone reading on June 21, 2015. My name is Geanie W. Morrison and I represent House District 30 in the Texas Legislature. I also serve as chair of the House Committee on Environmental Regulation and the House Select Committee on Federal Environmental Regulation.

The exceptional events demonstration is highly significant to the El Paso area, as it may cause the area to avoid an ozone nonattainment designation. A nonattainment designation creates substantial work for the TCEQ in revising the state implementation plan; imposes significant costs on local industry, which in turn increases the costs of necessities such as gasoline and electricity; and may put a stigma on the area making it more difficult to attract new businesses.

At the same time, a nonattainment designation would do little to improve air quality or public health in El Paso. El Paso and the TCEQ cannot reduce emissions from outside of Texas even if those out-of-state emissions bear a significant share of the responsibility for the measured ozone levels in El Paso. Even so, the monitored ozone levels are only slightly above the national ambient air quality standards set by the EPA, and are within levels that the EPA deemed safe in 2008.

EMAIL: Geanie.Morrison@house.state.tx.us

I concur with the TCEQ that the available evidence suggests that wildfires in Arizona and New Mexico contributed significantly to the elevated ozone levels detected at the UTEP monitor on June 21, 2015 and therefore qualify as an exceptional event. I therefore support the TCEQ's proposed exceptional events demonstration.

Again, I appreciate the opportunity to express my views regarding this important issue. Should you have any questions, please do not hesitate to contact my office.

Sincerely,

Geanie W. Morrison

Geanie W. Morrison

The State of Texas
House of Representatives

Joseph C. Pickett
El Paso • District 79

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September 19, 2016

Kristin Patton
MC 206, State Implementation Plan Team,
Office of Air
Texas Commission on Environmental Quality (TCEQ)
P.O. Box 13087
Austin, Texas 78711-3087

Re: TCEQ Proposed Ozone Exceptional Event Demonstration
El Paso UTEP Monitor, June 21, 2015 8-hour Ozone Reading

To Whom It May Concern:

It is my understanding that TCEQ is considering an exceptional event demonstration for the El Paso County area after a UTEP monitor ozone reading of 71 ppb on June 21, 2015.

As you know, exceptional event demonstration would be significant to the El Paso area, as it may cause the area to avoid an ozone nonattainment designation. A nonattainment designation would have an impact which in turn stands to increase the costs of necessities such as gasoline and electricity; and may put a stigma on the area making it more difficult to attract new businesses and be competitive economically with other cities in the Region.

At the same time, it may prove out that the nonattainment designation would do little to improve air quality or public health in El Paso since El Paso is directly impacted by out-of-state emissions, including our neighboring city of over 1 million people, Ciudad Juarez, Mexico. Juarez does impact a significant share of the measured ozone levels in El Paso, beyond control of the State.

I therefore support the TCEQ' s proposed exceptional events demonstration.

Respectfully,

Joe C. Pickett

Joe C. Pickett

cc: Greater El Paso Chamber Commerce

VERONICA ESCOBAR

El Paso County Judge

September 22, 2016

Kristin Patton
MC 2016 State Implementation Plan Team
Office of Air Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

Re: TCEQ Proposed Exceptional Event Demonstration

Dear Ms. Patton:

I write this letter in support of the Texas Commission on Environmental Quality's (TCEQ) proposed Exceptional Events Demonstration in El Paso in response to the University of Texas at El Paso's (UTEP) monitor ozone reading on June 21, 2015 that exceeded the Environmental Protection Agency's standard for ground-level ozone concentrations. The TCEQ has proposed the higher reading be classified as an exceptional events demonstration and I write to support the claim and explain why El Paso qualifies as such.

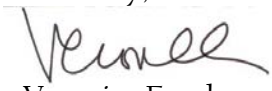
There are several factors, given our geographic location, which contributes to slightly higher ground level ozone concentration. El Paso is situated on the U.S. Mexico border adjacent to our sister city of Ciudad Juarez, Mexico and share the same air space. Less stringent air quality standards in Ciudad Juarez may contribute to higher ozone levels in El Paso, especially given UTEP is directly adjacent to Ciudad Juarez. In addition, wildfires in Arizona and New Mexico, our neighboring states, also contribute to elevated ozone levels. According to the National Weather Service there were over 500 wildfires in New Mexico in 2015 and as per the National Forest Service by early August of 2015 Arizona had experienced 27 wildfires. Despite El Paso's best efforts to ensure it meets state and federal regulations, these fires coupled with El Paso's location on the border can inadvertently lead to a higher ozone reading.

A nonattainment designation by the EPA would have a significant negative impact on our community. Consequences will include imposed mandates and permits for industrial facilities and operations such as refineries, power plants and smelters. This will in turn not only increase the prices of gasoline and electricity in El Paso, but will also make it more difficult to attract new businesses, as well as discourage industrial growth. Lastly, as we continue to build a vibrant community, a nonattainment designation would create a negative image for El Paso as having poor air quality despite our inability to reduce emissions from neighboring communities.

500 E. San Antonio, Suite 301, El Paso, TX 79901
Phone: 915-546-2098 · Fax: 915-543-3888 · countyjudge@epcounty.com · www.epcounty.com

It is our hope that TCEQ's recommendation to have an Exceptional Event Demonstration is approved and designate El Paso as reaching attainment standards or unclassifiable. I'd like to thank you for the opportunity to provide my feedback. If you have any questions please feel free to contact my office at 915-546-2098.

Sincerely,



Veronica Escobar
El Paso County Judge

September 26, 2016

Mr. Richard Hyde
Executive Director
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087

Submitted by email to: **amda@tceq.texas.gov**

Re: **Ozone Flag – Proposed Ozone Exceptional Event Demonstration for El Paso County for June 21, 2015**

Dear Mr. Hyde:

Western Refining, Inc. ("Western") respectfully submits these comments supporting the Texas Commission on Environmental Quality (TCEQ) proposed Exceptional Event demonstration for the date June 21, 2015, for use in the pending ozone designations under the 2015 Ozone National Ambient Air Quality Standards (NAAQS). EPA lowered the ozone standard from 75 ppb to 70 ppb on October 1, 2015, and plans to make final ozone designations of "Attainment" or "Nonattainment" for counties by October 1, 2017, based on ozone ambient air quality measurements from the years 2014 to 2016. The Exceptional Event demonstration plays a critical role in the final designation for El Paso County. We therefore appreciate the opportunity to provide comments on this important step towards implementing the 2015 ozone standard.

Western is an independent crude oil refiner and marketer of refined products, headquartered in El Paso, Texas. Western owns and operates three refineries, located in or near each of El Paso, Texas; Gallup, New Mexico; and St. Paul Park, Minnesota, with a combined capacity of 253,800 barrels per day. The wholesale segment includes a fleet of crude oil and finished product truck transports plus wholesale petroleum products operations in several states throughout the United States. The retail segment includes retail service stations and convenience stores in Arizona, Colorado, Minnesota, New Mexico, Texas and Wisconsin operating primarily through the Giant, Howdy's, and SuperAmerica brands. Western Refining, Inc. also owns the general partner and approximately 65% of the limited partnership interest of Western Refining Logistics, LP.

In El Paso County, Western's business and operations provide a substantial positive impact. Western has approximately 500 employees in the El Paso area, in the refinery and company offices. Our average wage for these employees is one of the highest average wages in El Paso. We employ a number of contractors in addition to company employees. And we operate more than 25 retail gasoline stations with convenience stores in El Paso, providing additional employment. We are the largest property tax payer in the county. Western donates approximately $1,000,000 annually to local non-profit, charitable organizations; our charitable donations include scholarships and donations to nearby schools, among other things, and we are the largest contributor to the United Way of El Paso.

Western supports TCEQ's submittal and EPA's approval of the Exceptional Event demonstration for June 21, 2015, for El Paso, an event caused by wildfires outside of Texas. The TCEQ proposed Exceptional Event demonstration meets all legal requirements for both the 2007 exceptional events rule as well as the September 16, 2016 amended exceptional events rule. The June 21, 2015, UTEP Exceptional Event has regulatory significance in that, based on preliminary 2016 data to-date, acceptance of the Exceptional Event would result in an attainment designation for El Paso, based on the design value calculated from data obtained in the years 2014 through 2016.

Western presents additional technical and legal support for the demonstration, as follows:

- Cover letter – summarizes evidence demonstrating the exceptional event demonstration meets all regulatory requirements.
- Attachment 1 - Legal Evaluation of Exceptional Events Demonstration: El Paso UTEP Monitor, June 21, 2015 – matches TCEQ evidence and supplemental evidence from this letter with EPA's 2007 and 2016 rule provisions and other EPA guidance for Exceptional Events.
- Attachment 2 – Technical Comments on the TCEQ Proposed Exceptional Events Demonstration for Wildfires that Influenced Ozone Concentrations in El Paso on June 21, 2015 – provides supplemental technical evidence over and above that provided by TCEQ in its proposed Exceptional Events Demonstration.
- Attachment 3 – Wildfires Influencing El Paso Exceptional Event on June 21, 2015 – provides information from the US Government web site for its Incident Information System, Inciweb[1], to validate information about contributing wildfires.
- Attachment 4 – Non-substantive Comments on Exceptional Events Demonstration: El Paso UTEP Monitor, June 21, 2015 – provides editorial, clarifying, and other non-substantive suggestions to the TCEQ proposed Exceptional Events Demonstration.

The following summarizes the evidence demonstrating that June 21, 2015, data from the El Paso UTEP air monitor meets all EPA criteria for an exceptional event.

The event affected air quality.

- The 77 ppb maximum daily average 8-hour (MDA8) ozone level at UTEP on June 21, 2015, is an extreme outlier when viewed in the context of a multiyear time series, and even more so considering it occurred on a Sunday.

- As presented below, wildfires outside of Texas have a clear causal relationship to the measured 8-hour ozone at the El Paso UTEP monitor on June 21, 2015.

- Other area monitors were likely also impacted by wildfire smoke on June 21, 2015, including:

[1] Located at http://inciweb.nwcg.gov/.

- El Paso Chamizal monitor
- Dona Ana County, New Mexico, Desert View monitor
- Dona Ana County, New Mexico, La Union monitor

The event is associated with a measured concentration in excess of normal historical fluctuations including background.

- The event exceeded the 99.9 percentile for 8-hour ozone measurements over the seven-year period from 2009 through 2015. Ozone measurements exceeded 70 ppb at the El Paso UTEP monitor only three other times in the seven-year period.

- The event falls at the 100 percentile for Sundays during 2009 to 2015 as the highest recorded 8-hour ozone measurement on any Sunday over the seven-year period.

- For Sundays in June for the years 2011 through 2015, the second highest Sunday measurement occurred on June 26, 2011, at 70 ppb. The second-high measurement for this period was a full 7 ppb lower than the Exceptional Event date of June 21, 2015, and did not exceed the 2015 ozone standard.

- Measurements of 8-hour ozone at the El Paso UTEP monitor did not exceed 70 ppb on any other Sunday during the peak ozone months of June and July during 2009 to 2015.

The event was caused by human activity that is unlikely to recur at a particular location or a natural event.

- Many of the fires were caused by lightning and dry conditions, a natural event.

- Once the wildfires burned out an area, that area is unlikely to have recurrence of another wildfire.

The event was not reasonably controllable or preventable.

- The event was caused by wildfires outside of Texas.

    - A number of wildfires occurred in California[2], Arizona, and New Mexico, including several sparked by lightning. Smoke plumes from the fires merged into a larger smoke mass.

- These wildfires occurred at the very dry time of year, during peak fire season, when lightning occurs but sufficient rainfall to overcome the dry conditions has not yet

[2] The Lake Fire was cited by Arizona Department of Environmental Quality for its own Exceptional Event demonstration for June 20, 2015, the day before the date in discussion in the demonstration for El Paso.

occurred. Thus, with dry conditions and lightning, factors conducive to fire initiation and propagation, the fires required several days to be brought under control and extinguished.

The wildfires noted above have a clear causal relationship to the measured 8-hour ozone at the El Paso UTEP monitor on June 21, 2015.

The merged smoke plume from several wildfires migrated to El Paso on June 21, 2015, and mixed down to ground level, evidenced by the following:

- For the dates June 18 through June 21, 2015, model simulation results and HMS fire and smoke analyses show the merging of smoke plumes from fires ranging across several states including California, Arizona, and New Mexico, and the merged plume moving into El Paso, Texas.

- Satellite photographic images show the merged smoke mass from the wildfires moving in the direction of El Paso and over El Paso.

- HYSPLIT trajectories from the Hog fire, provided in TCEQ's demonstration show a clear trajectory from the fire to El Paso.

- Ozone, $PM_{2.5}$, and CO measurements peaked simultaneously, at mid-day, on June 21, 2015, inconsistent with typical diurnal variation for $PM_{2.5}$ and CO and suggesting the common arrival time of ozone and smoke from the wildfires.

- Satellite aerosol optical depth imaging provided in TCEQ's demonstration shows the presence of aerosol in the El Paso atmosphere on June 21, 2015, indicating reduced visibility such as would occur from the presence of smoke.

- Other satellite imagery provided by TCEQ shows that CO was present and mixed down to the ground level, another indicator of wildfire smoke presence.

- Local NOx measurement indicates that local emissions were not a cause of the unusually high ozone on June 21, 2015.

- Aerosol optical depth measurement at White Sands, New Mexico, the white area just 70 miles north of El Paso, shows a spike in opacity on June, 21, 2015, consistent with the arrival of the smoke.

- Surface level winds from the southeast brought in pollution from south of the El Paso monitors, and at the same time, winds aloft carried ozone-rich air from the wildfires, from the north and west of the city.

- The aerosol absorption optical depth measurement over El Paso on June 21, 2015, shows the presence of elevated levels light-absorbing aerosol, possibly smoke.

- MODIS AQUA and MODIS Terra True Color Image on June 20, 2015 and June 21, 2015 show how the smoke mass traveled from White Sands to El Paso (Figure 24).

- Photographic evidence from El Paso shows clear evidence of haze presence on June 21, 2015, compared to other nearby days including another nearby day with no evidence of wildfire influence.

There would have been no exceedance or violation but for the event.

- The UTEP monitor incurred no other Sunday exceedance in June or July in the years 2009 through 2015.

- TCEQ's surrogate day analysis of a day with similar meteorological conditions but without wildfire impacts showed that the UTEP monitor was the below the level of the standard on the surrogate day.

In conclusion, TCEQ has made a strong case for EPA approval of the Exceptional Event Demonstration for the El Paso UTEP monitor for the date June 21, 2015. Data and information presented in this letter and its attachments serve to further bolster the information included in TCEQ's draft. For the reasons outlined throughout TCEQ's Exceptional Event Demonstration coupled with this letter and its attachments, EPA must approve this Exceptional Event Demonstration to be consistent with EPA's exceptional events guidance.

Given the significance of this Exceptional Event to implementation of the 2015 ozone standard in El Paso, Western Refining will continue to study the matter and reserves the right to supplement these comments after the comment deadline by submitting any supplements to both TCEQ and to EPA Region 6.

If you have any questions about these comments, please contact Marise Textor at 915-474-7897 or marise.textor@wnr.com.

Sincerely,

Ann Allen
Senior Vice-President
Environmental, Health, and Safety

Attachment 1

Legal Evaluation of Exceptional Events Demonstration: El Paso UTEP Monitor, June 21, 2015

The table below evaluates the Texas Commission on Environmental Quality's ("TCEQ") draft ozone exceptional events demonstration for the El Paso UTEP monitor for June 21, 2015, which was published for public review and comment on August 24, 2016.[1]

June 21, 2015 meets the criteria in EPA's 2007 Exceptional Events Rule as interpreted by past EPA guidance on exceptional events and situations in which EPA has approved other exceptional events demonstrations. This draft also satisfies the changes that EPA finalized for the Exceptional Events Rule on September 16, 2016.[2]

EPA is legally obligated to judge the June 21, 2015 UTEP exceptional event using the same legal interpretations that it applies to other exceptional events.[3] As outlined in the attached table, the applicable legal interpretations require EPA's concurrence with the TCEQ's draft demonstration.

	Demonstration Element - 2007 Exceptional Events Rule	**Demonstration Element - 2016 Revised Exceptional Events Rule[4]**	**Standard for Meeting the Demonstration Element**	**How the Demonstration Element is Met for the El Paso UTEP Monitor on June 21, 2015**
1	The event affects air quality, 40 C.F.R. § 50.1(j).	Narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s), new 40 C.F.R. § 50.14(c)(3)(iv)(A).	An event satisfies this element if it meets the "clear causal relationship" and "historical fluctuations" elements.[5]	As discussed below, the demonstration elements for "clear causal relationship" and "historical fluctuations" are satisfied. A narrative conceptual model is provided in Chapter 1 of the TCEQ's demonstration, which describes a conceptual model for ozone in El Paso, identifies the key fires that contributed to the ozone exceedance at the UTEP monitor, and provides an explanation of how the fire emissions contributed to the measured ozone level. Wildfires are a significant part of the appropriate conceptual model for the highest-ozone days observed in El Paso.

[1] *See* http://tceq.state.tx.us/airquality/sip/Hottop.html/ (last accessed September 15, 2016).
[2] https://www.epa.gov/sites/production/files/2016-09/documents/exceptional_events_rule_revisions_2060-as02_final.pdf (last accessed September 19, 2016).
[3] *See, e.g., National Environmental Development Association's Clean Air Project v. EPA*, 752 F.3d 999 (D.C. Cir. 2014) (vacating an EPA guidance that sought to apply different legal standards to Clean Air Act Title V permitting decisions in some, but not all, areas of the U.S.); 40 C.F.R. § 56.3(a) ("It is EPA's policy to: (A) Assure fair and uniform application by all Regional Offices of the criteria, procedures, and policies employed in implementing and enforcing the act.").
[4] https://www.epa.gov/sites/production/files/2016-09/documents/exceptional_events_rule_revisions_2060-as02_final.pdf (last accessed September 19, 2016); 80 Fed. Reg. 72,839 (Nov. 20, 2015).
[5] 72 Fed. Reg. 13,560, 13,569 (Mar. 22, 2007); Memorandum from Stephen D. Page, EPA, to Regional Air Directors, Regions I-X, Subject: Interim Guidance to Implement Requirements for the Treatment of Air Quality Monitoring Data Influenced by Exceptional Events (May 10, 2013) at 4 (available at https://www.epa.gov/sites/production/files/2015-05/documents/exceptevents_guidememo_130510.pdf, last accessed September 15, 2016).

	Demonstration Element - 2007 Exceptional Events Rule	Demonstration Element - 2016 Revised Exceptional Events Rule[4]	Standard for Meeting the Demonstration Element	How the Demonstration Element is Met for the El Paso UTEP Monitor on June 21, 2015
2	The event is not reasonably controllable or preventable, 40 C.F.R. § 50.1(j).	The event is not reasonably controllable or preventable, new 40 C.F.R. § 50.14(c)(3)(iv)(D).	This demonstration element is met for wildfires generally and for fires located outside of the state submitting the Exceptional Events demonstration.[6]	The relevant fires were wildfires and were outside of Texas and therefore could not be regulated by the TCEQ.[7]
3	The event is an event caused by human activity that is unlikely to recur at a particular location or a natural event, 40 C.F.R. § 50.1(j).	The event was a human activity that is unlikely to recur at a particular location or was a natural event, new 40 C.F.R. § 50.14(c)(3)(iv)(E).	Wildfires presumptively qualify as natural events, and even if influenced by human activity meet this criterion if they are unlikely to recur at that particular location.[8]	The primary wildfire in question was caused by a lighting strike, which is a natural cause. For the small-acreage contributing fires that were caused by human activity, the burning out of those areas significantly reduces the likelihood of another fire in that particular location.[9]

[6] 80 Fed. Reg. at 72,843; EPA, *Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations* (Final Sept. 2016), at 32, available at https://www.epa.gov/sites/production/files/2016-09/documents/exceptional_events_guidance_9-16-16_final.pdf (last accessed Sept. 19, 2016); Memorandum from Stephen D. Page, EPA, to Regional Air Directors, Regions I-X, Subject: Interim Guidance to Implement Requirements for the Treatment of Air Quality Monitoring Data Influenced by Exceptional Events (May 10, 2013) at 5; EPA, *Draft Guidance to Implement Requirements for the Treatment of Air Quality Monitoring Data Influenced by Exceptional Events* (June 2012) at 4.
[7] TCEQ Demonstration section 2.6, page 2-4; sections 3.4-3.5, page 3-3.
[8] 80 Fed. Reg. at 72,850; 72 Fed. Reg. at 13,566.
[9] TCEQ Demonstration section 2.7, pages 2-4–2-5.

	Demonstration Element - 2007 Exceptional Events Rule	Demonstration Element - 2016 Revised Exceptional Events Rule[4]	Standard for Meeting the Demonstration Element	How the Demonstration Element is Met for the El Paso UTEP Monitor on June 21, 2015
4	There is a clear causal relationship between the measurement under consideration and the event that is claimed to have affected air quality in the area, 40 C.F.R. § 50.14(c)(3)(iv)(B).	The event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation, new 40 C.F.R. § 50.14(c)(3)(iv)(B).	An exceptional event meets the common features of the "clear causal relationship" and "but for" elements if the demonstration includes the following: • Evidence of biomass burning, acreage, and air trajectories linking the burnt areas to the high-ozone air quality monitors.[10] • "Altered pollutant amounts, ratios, or patterns that indicate the influence of the event rather than non-event sources. This information could include the level, timing and patterns of CO and PM..."[11] • "Evidence that the plume from the fire passed over the location of the monitoring site and mixed down to ground level. This can include...visual smoke observations..."[12]	The June 21, 2015 event satisfies this prong as follows: • There is evidence of wildfires with defined acreage, and air trajectories link those fires to the UTEP monitor on June 21, 2015.[13] • There is an unusual correlation between PM2.5 emissions and ozone on June 21, 2015, indicative of biomass combustion products. • There are satellite measurements of elevated CO and aerosol optical depth data on June 21, 2015, also indicative of biomass combustion. • Images from TCEQ-operated webcams located at El Paso air quality monitors show the presence of substantial visibility-impairing smoke on June 21, 2015, which further indicates the connection between wildfires and the ozone exceedance at the UTEP monitor.[14]

[10] Letter from Karl Brooks, EPA Region 7, to John Mitchell, Kansas Department of Health and Environment, Re: Exceptional event requests regarding exceedances of the 8-hour ozone NAAQS at multiple monitors in Kansas during April of 2011 (Dec. 28, 2012), available at http://www.kdheks.gov/bar/air-monitor/exceptevent/Flint_Hills_Letter_12-28-12.pdf (last accessed September 15, 2016); Kansas Department of Health and Environment, *State of Kansas Exceptional Event Demonstration Package: April 6, 12, 13, and 29, 2011* (Nov. 27, 2012) at Chapter 4 (available at https://www.epa.gov/sites/production/files/2015-05/documents/kdhe_exevents_final_042011.pdf, last accessed September 15, 2016).

[11] EPA, *Interim Exceptional Events Rule Frequently Asked Questions* (May 2013) at 10-11 (available at https://www.epa.gov/sites/production/files/2015-09/documents/eer_qa_doc_5-10-13_r3.pdf, last accessed Sept. 16, 2016).

[12] *Id.*

[13] TCEQ Demonstration section 3.2, pages 3-1–3-3, section 3.7, pages 3-5–3-9.

[14] Archived images from the monitor webcams are available on request from TCEQ staff.

	Demonstration Element - 2007 Exceptional Events Rule	Demonstration Element - 2016 Revised Exceptional Events Rule[4]	Standard for Meeting the Demonstration Element	How the Demonstration Element is Met for the El Paso UTEP Monitor on June 21, 2015
5	There would have been no exceedance or violation but for the event, 40 C.F.R. § 50.14(c)(3)(iv)(D).	--	In addition to the common features of the "clear causal relationship" and "but for" elements as discussed above under the "clear causal relationship" element, an event meets the "but for" test if it: • Relies on "analysis of ozone concentrations on days with similar meteorological conditions but without smoke impacts"[15] to demonstrate that the exceedances would not have occurred but for the fires in question.[16] • Provides "Statistical evidence that shows that for the place, time of year, and prevailing weather conditions at the time of the event, past ozone data show no history of exceedances on days that were not affected by a fire event, or shows that exceedances were so infrequent as to make the fire at issue the more likely cause of the observed exceedance."[17]	June 21, 2015 meets the "but for" test as follows: • The TCEQ's demonstration includes analysis of a day with similar meteorological conditions but without wildfire impacts, during which the UTEP monitor was below the ozone standard.[18] • From 2009-2015, there was no other ozone exceedance at the UTEP monitor on a Sunday in June or July besides June 21, 2015. The second-highest UTEP Sunday ozone measurement during June 2009-2015 was 70 ppb. • Biomass burning generally has been found to cause 24-100% increases in surface ozone concentrations,[19] an increase more than sufficient to cause the June 21, 2015 ozone exceedance. • The common features of the "but for" and "clear causal relationship" elements are met, as noted above.

[15] Letter from Karl Brooks, EPA Region 7, to John Mitchell, Kansas Department of Health and Environment, Re: Exceptional event requests regarding exceedances of the 8-hour ozone NAAQS at multiple monitors in Kansas during April of 2011 (Dec. 28, 2012); Kansas Department of Health and Environment, *State of Kansas Exceptional Event Demonstration Package: April 6, 12, 13, and 29, 2011* (Nov. 27, 2012) at 1-8.

[16] The Kansas demonstration included photochemical modeling for some, but not all of the days excluded. For April 29, 2011, an EPA-approved day in which out of state fires were involved, the Kansas demonstration observed that photochemical modeling could not replicate the effects of Texas fires on Kansas ozone but was not a necessary component of the demonstration. *Id.* at 6-32.

[17] EPA, *Interim Exceptional Events Rule Frequently Asked Questions* (May 2013) at 10-11 (available at https://www.epa.gov/sites/production/files/2015-09/documents/eer_qa_doc_5-10-13_r3.pdf, last accessed Sept. 16, 2016).

[18] TCEQ Demonstration section 2.12, page 2-7, section 3.8, pages 3-9–3-12.

[19] "Globally, ozone precursors (e.g. VOCs and NOx) emitted by vegetation fires are responsible for about 10% enhancement of tropospheric ozone levels. Regionally, however, biomass burning can temporally increase background surface ozone concentrations by 24% to well over 100% causing exceedence of regulatory standards. Ozone formed in smoke plumes along with its precursors and aerosol particles emitted from large fires can be transported by weather systems over large distances spanning continental scales. When brought down toward the surface via smoke plume entrainment into the planetary boundary layer, fire-generated VOCs and NOx can cause severe ozone episodes over metropolitan areas that are hundreds and even thousands of miles away from the fire locations." Ned Nikolov, *Impact of Wildland Fires and Prescribed Burns on Ground Level Ozone Concentration: Review of Current Science Concepts and Analytical Approaches* (prepared for U.S. Forest Service), available at https://www.nifc.gov/smoke/documents/Impact_Wildland_fire_on_Ozone.pdf, last accessed Sept. 16, 2016).

	Demonstration Element - 2007 Exceptional Events Rule	Demonstration Element - 2016 Revised Exceptional Events Rule[4]	Standard for Meeting the Demonstration Element	How the Demonstration Element is Met for the El Paso UTEP Monitor on June 21, 2015
6	The event is associated with a measured concentration in excess of normal historical fluctuations, including background, 40 C.F.R. § 50.14(c)(3)(iv)(C).	Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times, new 40 C.F.R. § 50.14(c)(3)(iv)(C).	An event meeting any of the following tests exceeds normal historical fluctuations: • The event exceeds the 95th percentile of historical values during the relevant season.[20] • The ozone measurement was the second-highest ozone level recorded at the particular monitor during that calendar year (as indicated by a recent demonstration co-authored by EPA Region 8).[21] • The event affects fewer than 135 exceedances on 25 days (as indicated by a recent court decision upholding an EPA action that concurred with 135 exceptional events claims affecting 25 days in the Phoenix, Arizona area).[22]	The June 21, 2015 El Paso exceptional event meets all three formulations: • The June 21, 2015 ozone levels at the UTEP monitor were above the 99th percentile of data from the seven-month El Paso ozone season over a six-year period, and was above the 99.9 percentile of ozone readings during the 7-year period from 2009-2015. • The June 21, 2015 UTEP ozone level was the second-highest recorded ozone level in El Paso during 2015. • For purposes of the TCEQ's demonstration, the event is policy-relevant by affecting a single ozone exceedance at a single monitor.[23] June 21, 2015 was selected on the basis of its policy relevance, although most ozone exceedances in the El Paso area since 2009 coincided with nearby wildfire activity (as evidenced by the presence of smoke) and would potentially meet the definition of exceptional events.

[20] 72 Fed. Reg. 13,560, 13,569 (Mar. 22, 2007) ("In addition, the magnitude of the measured concentration on days affected by exceptional events relative to historical, temporally adjusted air quality levels can guide the level of necessary analysis and documentation to demonstrate that the event affected air quality. **For extremely high concentrations relative to historical values (e.g., concentrations greater than the 95th percentile), a lesser amount of documentation or evidence may be required to demonstrate that the event affected air quality.** The closer the event concentration is to typical levels (e.g., values less than the historical 75th percentile), the stronger the necessary evidence would have to be to justify exclusion of data for regulatory purposes. This weight of evidence approach is most nearly analogous to our historical treatment of exceptional events.") *see also* EPA, *Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations* (Final Sept. 2016), Figures 2 and 3.

[21] Ute Indian Tribe of the Uinta and Ouray Reservation, U.S. EPA Region 8, Utah State University Bingham Energy Center, and Utah Division of Air Quality, *Technical Support Documentation: Ozone NAAQS Exceedances Occurring June 8 and 9, 2015, Uinta Basin of Utah* (Aug. 30, 2016) at 3 (available at https://www.epa.gov/sites/production/files/2016-08/documents/tsd_strato3_june_2015_ute_tribe_public_comment.pdf, last accessed September 15, 2016).

[22] *Bahr v. EPA*, No. 14-72327, 2016 WL 4728040 (9th Cir. Sept. 12, 2016).

[23] TCEQ Demonstration section 2.11, page 2-7, section 3.1, page 3-1, section 3.6, page 3-3.

Attachment 2. Technical Comments on the TCEQ Proposed Exceptional Event Demonstration for Wildfires that Influenced Ozone Concentrations in El Paso on June 21, 2015

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Technical Comments on the TCEQ Proposed Exceptional Event Demonstration for Wildfires that Influenced Ozone Concentrations in El Paso on June 21, 2015

1. Wildfires

In Table 1-2 of TCEQ's exceptional event demonstration, TCEQ listed other fires further north and west in Arizona in addition to the Hog Fire that may have contributed to high ozone in El Paso on June 21, 2015. Indeed the weight of evidence shows that the other Arizona fires listed in Table 1-2 as well as New Mexico and California fires listed below which were not cited by TCEQ impacted the air quality in El Paso on that date. Satellite visible imagery and modeling simulations of smoke transport and dispersion support the following additions to the contributing fires listed in Table 1-2 of the TCEQ demonstration.

- Lake Fire, CA; 34.16 latitude, -116.893 longitude[1]
- Pinon Fire, NM; 33.7 latitude, -108.767 longitude[2]
- Moore Fire, NM; 33.212 latitude, -108.102 longitude[3]
- Red Canyon Fire, NM; 33.756 latitude, -107.456 longitude[4]

Attachment 3 documents several of the fires in the TCEQ demonstration as well as those listed above[5]. Recognizing these additional fires provides a more complete conceptual model of this complex event. The Pinon, Moore, and Red Canyon fires in New Mexico were ignited by lightning on June 15 to 16, 2015; within 1-2 days of when the Hog Fire ignited. The Lake Fire was first spotted in San Bernardino County, CA, on June 17, 2015, and grew rapidly through June 20, 2015, as the smoke plume spread to the east (Figure 1).[6] The cause of the Lake Fire was still being investigated as of July 7, 2016, which is the date of the last InciWeb Report.[7] On June 19 to 20,

[1] Basic information about the Lake Fire is accessible on InciWeb at http://inciweb.nwcg.gov/incident/4302/.
[2] http://inciweb.nwcg.gov/incident/4297/.
[3] http://inciweb.nwcg.gov/incident/4296/.
[4] http://inciweb.nwcg.gov/incident/4311.
[5] Inciweb did not have information on the remaining fires.
[6] Arizona Department of Environmental Quality (ADEQ) prepared an Exceptional Events Demonstration for Maricopa County regarding impacts of the Lake Fire on June 20, 2015. https://www.azdeq.gov/notices/public-notice-exceptional-events-maricopa-county-greater-phoenix-o3-nonattainment-area.
[7] Basic information about the Lake Fire is accessible on InciWeb at http://inciweb.nwcg.gov/incident/4302/.

2015, dense smoke from the Lake Fire reportedly covered a large portion of the southwestern United States as the plume merged with and entrained lighter density smoke plumes from the several smaller wildfires in central and eastern Arizona. The Lake Fire contributed to ozone NAAQS exceedances in Phoenix on June 20, 2015, according to an exceptional event demonstration submitted to EPA Region 9 by the Arizona Department of Environmental Quality (ADEQ).

The following narrative from the NOAA Satellite Text Smoke Product for June 19, 2015 describes the evolution and spread of the large smoke mass anchored by the Lake Fire as it approached El Paso in the days leading up to June 21, 2015.

> "A large wildfire in southern California, called the Lake Fire, continues to produce a heavy density plume that has shifted more to the south this afternoon/evening. Light density remnant smoke from this wildfire encompasses southeastern California, Arizona, eastern Utah, southwestern Wyoming, western Colorado, western New Mexico and northwestern Mexico into Baja. Lake Fire has burned over 13000 acres in the San Bernardino Mountains of southern California since June 17th. Another wildfire that was producing heavy density smoke, called Whitetail, was observed in southeastern Gila County in Arizona and was moving to the southeast into southwestern New Mexico. Several other wildfires in central and eastern Arizona that have continued to burn over the past few days have produced light to moderate density smoke plume that have merged into the larger mass of smoke from the Lake Fire."[8]

Archived model simulation results by the Naval Research Laboratory (NRL) Navy Aerosol Analysis and Prediction System (NAAPS) (Figure 2) support the NOAA analysis. The model output also illustrates the transport of wildland fire smoke towards El Paso and the transition of several distinct plumes to an irregularly shaped smoke mass.

The aforementioned fires occurred during peak fire season (Figure 3).

2. Event-Related Concentration in the Context of Historical Concentrations

The 77 ppb maximum daily average 8-hour (MDA8) Ozone level at UTEP on June 21, 2015, is an extreme outlier when viewed in the context of a multiyear time series, and even more so considering it occurred on a Sunday.

An MDA8 ozone level higher than the 77 ppb on June 21, 2015, was measured on only six of the other 2,475 days with valid monitoring data at UTEP during the seven-year period from 2009 to 2015[9] (Figure 4), none of which happened on a Sunday. This ranking places June 21, 2015, above

[8] 2015 Satellite Text Smoke Product. Descriptive text narrative for smoke/dust observed in satellite imagery through 0230Z for June 20, 2015. http://www.ssd.noaa.gov/PS/FIRE/2015_archive_smoke.html.

[9] Data collected before 2009 were omitted from this analysis because of the significant step-change in the number of high ozone days per year between 2008 and 2009 shown in the following chart.

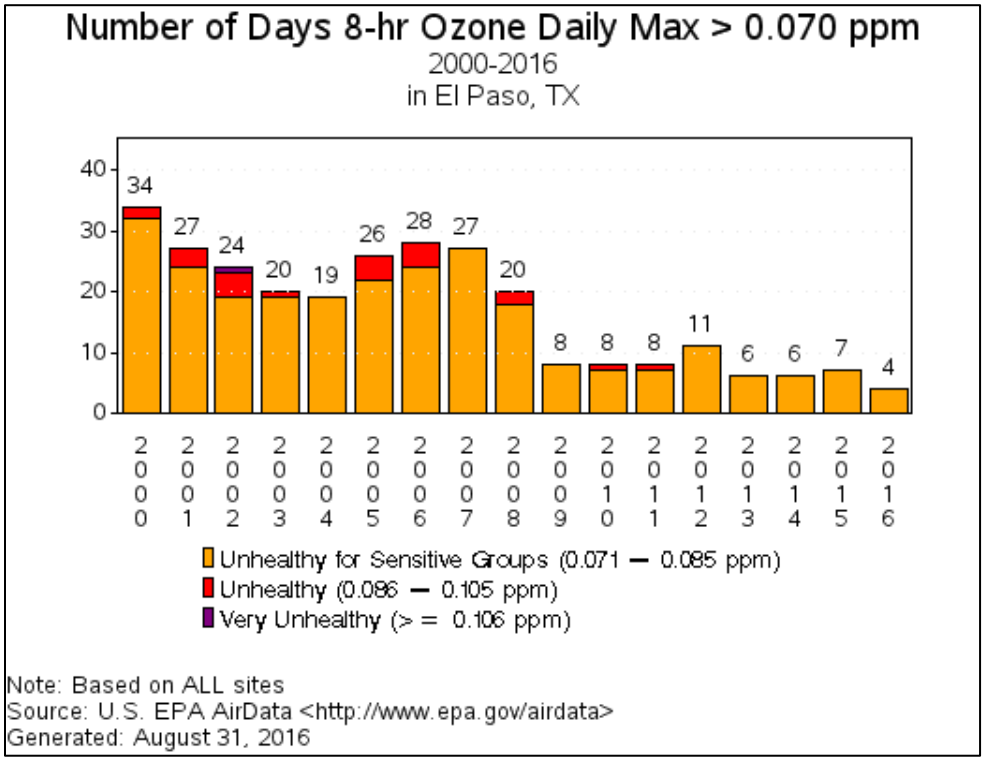
the 99.9 percentile for this entire seven-year period and at the 100 percentile for Sundays during 2009 to 2015. MDA8 ozone levels were also measured at nearby monitors on June 21, 2015, as follows:

- Above the 99.9 percentile at El Paso Chamizal (AQS# 48-141-0044).
- Above the 99 percentile at both Desert View (AQS# 35-013-0021) and La Union (AQS# 35-013-0008), in adjacent Dona Ana County, New Mexico.

The UTEP MDA8 on June 21, 2015, which was a Sunday, stands out more prominently as an outlier when viewed in the context of other Sundays (Figure 5):

- The 77 ppb measured on June 21, 2015, was the highest MDA8 measured at UTEP on a Sunday during the seven year period of 2009 to 2015.
- MDA8 ozone did not exceed 70 ppb at UTEP on any Sunday in 2015, except on June 21, 2015.
- MDA8 ozone exceeded 70 ppb at UTEP on only three other Sundays during 2009 to 2015.

Furthermore, the UTEP MDA8 on June 21, 2015, stands out prominently as an outlier when viewed in the context of other Sundays during June and July:



El Paso ozone exceedance day trends (downloaded from https://www3.epa.gov/airdata/ on August 31, 2016). A step-change in the average number of exceedance days per year, from 25 to less than 8, took place from 2008 and 2009. The decrease is statistically significant at the 95% confidence level.

- MDA8 ozone levels only exceeded 70 ppb on one Sunday during the peak ozone months of June and July at UTEP during 2009 to 2015, that being on June 21, 2015 (Figure 6).
- For the six-year period of 2011 to 2016, the second highest MDA8 ozone on a Sunday in June was 70 ppb, a full 7 ppb lower than the value on June 21, 2015, and was not an exceedance of the 2015 ozone standard (Figure 7).

These statistics demonstrate that the 77 ppb MDA8 ozone at UTEP on June 21, 2015, is a rare occurrence, and even more rare when considered in the context of typical weekly variation in ozone in the region, especially during June and July.

3. General Conceptual Model

The conceptual model described in the TCEQ technical demonstration appears to distinguish high ozone days just on the basis of meteorological variables; however, the meteorological conditions described in the conceptual model also occur on dates without high ozone. Highest ozone levels occur during peak wildfire season, and wildfires may be an important element of the conceptual model for ozone in El Paso, at least on some of the highest ozone days.

Variability in the surface weather conditions that largely define the existing El Paso conceptual model does not sufficiently explain why some days have high ozone and other days do not. Elevated ozone levels tend to occur in El Paso on days having high temperatures, abundant sunshine, and light southeasterly surface winds; however, these general weather conditions have also been observed on numerous days when ozone levels were not particularly high. Such weather conditions may be necessary but not always sufficient for episodic high ozone. The conceptual model requires refinements that take account of additional weather parameters or other factors such as nonroutine emissions, background ozone, transport, and exceptional events.

Hot, dry conditions with low wind speeds and sporadic lightning increase the threat of wildfire outbreaks in the southwestern U.S.[10] These conditions match those with episodic high ozone. Therefore, days with high ozone and days with high wildfire potential often coincide. Furthermore, when wildfires occur, emissions of ozone precursors generated by combustion of wildfire fuels would tend to boost the MDA8 above the levels that would be reached on other days with the same ozone-favorable weather but without wildfires and their associated emissions.

The analysis by Kavouras, et al.[11] provides two examples, from the six days during 2008 to 2014 when MDA8 exceeded 77 ppb, when wildfires influenced the measured ozone levels at UTEP.

[10] "Quantification of Fire Season Potential for the Southwest Area." SWCC Predictive Services, January 27, 2014. Accessed online at http://gacc.nifc.gov/swcc/dc/azphc/documents/SW_Seasonal_Factors-1.pdf on September 25, 2016.

[11] "Technical Report, Ozone pollution: Sources of precursors, drivers of high ozone days and influence of wildfires", Submitted by Profl. Ilias Kavouras and Dr. David DuBois, Submitted to Mr. Michael Medina, El Paso Metropolitan Planning Organization, June 31 [sic], 2016.

Their conclusions are supported by the NOAA HMS fire/smoke analyses for those days, which show widespread smoke covering most of the southwestern U.S. (Figures 8 and 9). On most other days when the UTEP MDA8 reached 77 ppb or greater, the corresponding HMS analysis indicated smoke or fire activity in the general vicinity of west Texas, southern New Mexico or northwestern Mexico.

The highest ozone levels in El Paso occur during peak wildfire season. Ozone in El Paso generally occurs from April to September. Nonetheless, the very highest ozone levels, i.e., those ozone levels equal to or greater than the ozone level measured on June 21, 2015, only occurred during June and July, coinciding with the peak wildfire activity in Arizona and New Mexico (Figure 3)[12]. The following illustrates the overlap between peak ozone and wildfire seasons:

- During 2009 to 2015, days with MDA8 greater than or equal to 77 ppb at UTEP only occurred during June and July, i.e. the peak months of the wildfire season in Arizona and New Mexico.
- During 2009 to 2015, 11 of the 12 highest ozone days (comprising all the days when MDA8 was at least 75 ppb) at UTEP were in the months of June or July while only 10 of the next highest 21 days (MDA8 ranging from 71 to 74 ppb) were in June or July.

Thus, ozone production from wildfires may be an important missing element of the conceptual model for ozone in El Paso, at least on some of the highest ozone days.

4. Conceptual Model for June 21, 2015

On June 21, 2015, very high temperatures and very low wind speeds provided favorable conditions for the production and accumulation of ozone in El Paso. Concurrently, winds veering with height promoted transport from south of the border at the surface, the Hog fire to the west at low levels above the surface, and from the mountainous regions north and west of El Paso at higher levels aloft, where the wildfires burned.

On June 16 to 18, 2015, lightning ignited several large wildfires in Arizona and New Mexico. Another very large fire, the Lake Fire, ignited in Southern California on June 17, 2015. The high temperatures and sunshine over the next few days provided favorable conditions for ozone to form from the wildfire emissions as the smoke spread towards the east. As the smoke dispersed over the steep mountainous terrain, the plumes from the individual fires detached from the sources and coalesced into an irregularly shaped mass covering much of the southwestern portion of the U.S. (Figure 10).

Despite the absence of a well-defined visible plume, measurements of aerosol optical depth at White Sands National Monument (the large white area in the Figures, approximately 70 miles north of El Paso) and statements from the National Forest Service document the continued progression of the smoke mass toward El Paso. The smoke spread out towards the east and into and beyond

[12] Based on analysis of data from 2009 to 2015

the Rio Grande Valley (Figures 11, 12, and 13). The smoke moved over White Sands National Monument east of the Rio Grande Valley, where the AERONET data shows a spike in the optical depth on June 21, 2015 (Figure 14).

An update from the Department of Agriculture Forest Service provided on June 21, 2015, states the following about the transport of smoke over the Gila National Forest from June 20 to 21:

> **"SILVER CITY, NM; June 21, 2015 –** Hazy skies are clearing after smoke from wildfires across the region settled in local communities around the Gila National Forest overnight.
>
> Several lightning-caused wildfires are being managed to achieve resource objectives on the Gila National Forest: Pinon Fire on the Reserve Ranger District (1,600 acres), Moore Fire on the Wilderness Ranger District (950 acres), and the Middle Fire on the Wilderness Ranger District (50 acres). The three fires are being used to remove hazardous fuels and reduce the risk of severe wildfire occurrence . . . .
>
> . . . . Smoke production may increase at times and settle in communities during the management of these fires as the accumulation of forest debris and dead and down fuel is burned. Smoke from a large fire in Arizona may also contribute to the overall smoke accumulation over our communities . . . ."[13]

The smoke observation over White Sands and the above Forest Service reference document the wildfire smoke movement towards El Paso.

Surface level winds from the southeast brought in pollution from south of the El Paso monitors. At the same time, northerly winds aloft provided favorable conditions for transporting the smoke seen in the satellite photographs of White Sands and any ozone or ozone precursors generated from the fires towards the UTEP monitor (Figure 15).

Veering winds may help to explain the effect of wildfire emissions on El Paso ozone even when surface winds are from a different direction. Veering winds were evident from trajectories traced backward at different elevations on high ozone days from 2012 to 2014 and are indicated by backward air trajectories produced by EPA, which suggest transport of pollution from the south-southeast near the surface and from the west-northwest aloft (Figure 16).

5. Clear Causal Relationship

Smoke from the merged wildfire plumes traveled to White Sands, New Mexico, and then to El Paso, as illustrated by evidence including satellite photographic imagery, aerosol optical depth measurements, diurnal trends of particulate matter and carbon monoxide with ozone, and photographs.

[13] http://www.fs.usda.gov/detail/gila/news-events/?cid=STELPRD3842155

5A. Relationship of Ozone and Fine Particulate Matter

Simultaneous peaks of Ozone and $PM_{2.5}$ suggest the common arrival time of ozone and smoke from the wildfires.

Ozone and $PM_{2.5}$ measurements peaked simultaneously, at mid-day, on June 21, 2015 at both the El Paso UTEP and Las Cruces (New Mexico) Desert View monitors (Figures 17 and 18), as well as at the nearby Chamizal and Ascarate El Paso monitors. On the other hand, the typical diurnal profiles for ozone and $PM_{2.5}$ peak at opposite times of the day (Figure 19). Thus, the unusual diurnal variation of $PM_{2.5}$ on June 21, 2015, coupled with the simultaneous peak with ozone suggests a common source for ozone and $PM_{2.5}$ on June 21, 2015, distinct from typical ozone and $PM_{2.5}$ sources in El Paso. Therefore, the simultaneous peaks suggest the common arrival time of ozone and smoke from the wildfires.

5B. Relationship of Ozone and Carbon Monoxide

Simultaneous peaks of Ozone and CO suggest the common arrival time of ozone and smoke from the wildfires.

Similarly to particulate matter, ozone and CO peaked simultaneously on June 21, 2015. The typical diurnal profile for CO peaks late in the day and does not peak in the morning or at mid-day; however, on June 21, 2015, CO incurred a mid-day peak at the UTEP monitor, again indicative of wildfire emissions (Figure 20). CO remote sensing data for June 21, 2015, at 700 and 850 millibars, show a CO plume that originated over the area of the fires extended to El Paso (Figure 21).[14]

5C. NOx Diurnal Variation

Local NOx measurement and local fresh emissions generation do not explain the high ozone on June 21, 2015.

The UTEP monitor measured relatively low levels of NO_x (an ozone precursor produced by combustion processes) on June 21, 2015, typical of Sunday NOx concentrations, and lower than average weekday NOx concentrations (Figure 22). Commute traffic and other heavy equipment generate more NOx on weekdays than on Sundays, which do not have the heavy commute traffic or the same level of other activity.

[14] The 700 millibar and 850 millibar pressure levels serve as two of the standard upper air meteorological surfaces often used in air quality analyses and weather forecasting. The 700 millibar level is approximately 3000 meters above sea level in the standard atmosphere. The 850 millibar level is approximately 1000 meters above sea level in the standard atmosphere and located approximately at the top of the daytime boundary layer.

5D. Aerosol Optical Depth

Aerosol Optical Depth measurements indicate possible presence of smoke over El Paso.

The aerosol absorption optical depth measurement over El Paso on June 21, 2015, shows the presence of elevated levels light-absorbing aerosol, possibly smoke (Figure 23).

5E. Travel of Smoke to El Paso

Smoke transported from the fires to El Paso. Measurements at White Sands confirmed the migration of the smoke mass towards the southeast.

Aerosol optical depth measurement at White Sands, New Mexico, just 70 miles north of El Paso, shows a spike in opacity on June, 21, 2015, consistent with the arrival of the smoke mass.

MODIS AQUA and MODIS Terra True Color Image on June 20, 2015 and June 21, 2015 show how the smoke mass traveled from White Sands to El Paso (Figure 24).

Furthermore, GOES (Geo-Stationary Satellite) with images obtained once every 30 minutes for June 20 and June 21, 2015, show smoke from fires drifting towards White Sands and then in a southerly direction towards El Paso.[15] Since these images must be viewed as a number of images over the course of the two days, they have not been provided here but may be obtained at the reference location.

5F. Visual Imagery of Smoke over El Paso

Photographs confirm the presence of haze over El Paso on June 21, 2015.

Photographs taken at TCEQ's Ranger Peak webcam site in El Paso, located at 1700 McKinley Ave, show the presence of smoke on June 21, 2015, obscuring visibility of mountains, compared to similar photographs taken on June 19, 2015 (Figure 25). Additional photos from the same camera show haze buildup from June 17 to June 21, 2015, where haze reached its peak, and then clearing on June 22 (Figure 26).

Furthermore, comparing June 17, another high ozone day but without smoke influence, to June 21, shows the presence of haze on June 21 but not on June 17 (Figure 27).

All photographs were obtained by permission from TCEQ.

[15] http://www2.mmm.ucar.edu/imagearchive/index.html

6. Weight of Evidence

The weight of evidence confirms the presence of wildfire-induced ozone over El Paso on June 21, 2015, considering all of the following:

- Several wildfires in California, Arizona, and New Mexico formed a large mass of smoke that moved to El Paso on June 21, 2015.
- Surface level winds from the southeast brought in pollution from south of the El Paso monitors, and at the same time, winds aloft carried ozone-rich air from the wildfires, from the north and west of the city.
- $PM_{2.5}$ and CO measurements peaked simultaneously with ozone, contrary to normal diurnal variations, suggesting concurrent arrival of ozone and the other pollutants.
- Low NOx measurements show no unusual significant locally generated NOx that would account for the ozone measured on the day.
- Aerosol optical depth measurements indicate possible presence of smoke over El Paso.
- Photographic imagery shows haze in El Paso.
- Visual imagery shows smoke over El Paso (Figures 12A and 19).

Figures for Attachment 2.

Figure	Page	Description of Figure
1	15	***The Lake Fire produced a large smoke plume.*** NASA's Aqua satellite collected this natural-color image with the Moderate Resolution Imaging Spectroradiometer (MODIS) on June 18, 2015. Actively burning areas, detected by MODIS's thermal bands, are outlined in red http://www.nasa.gov/image-feature/goddard/lake-fire-in-california-burns-over-11000-acres .
2	16	***Individual smoke plumes merged into a regional smoke mass.*** Model simulation results by the Naval Research Laboratory (NRL) Navy Aerosol Analysis and Prediction System (NAAPS) illustrate the evolution and spread of the wildfire smoke toward El Paso. Archived model output was accessed on September 10, 2016 from http://www.nrlmry.navy.mil/aerosol/. On June 18 (top left) the NAAPS model simulates the near-field dispersion of the Whitetail Fire smoke mass in eastern Arizona. On June 19 (bottom left) NAAPS simulates the spread of smoke from the Whitetail fire toward the east into New Mexico and smoke from the Lake Fire into western Arizona. Smoke from the Horse Tank and Camillo fires are also indicated northwest of the Whitetail fire. On June 20 (top right) NAAPS projects the near-field dispersion of smoke from the Hog Fire near the Arizona and New Mexico border with Mexico and the Pinon and Moore Fires in Eastern NM. The simulated smoke covers Arizona and the entire eastern half of New Mexico as the individual plumes begin to merge into a regional mass. On June 21 (bottom right) the eastern edge of the simulated smoke mass stretches into west Texas and the individual fire plumes begin to lose their identities as they continue to coalesce.
3	17	***Peak fire season median dates in Arizona and New Mexico occur from mid-June until the first of July.*** Median Dates for "Peak Seasonal Fire Danger" from the National Interagency Fire Center obtained from National Interagency Fire Center (NIFC), Geographic Area Coordinating Group (GACG), Southwest Coordination Center (SWCC) at (http://gacc.nifc.gov/swcc/predictive/outlooks/peak_ending_timeframes/SW_season_timing.pdf)
4	18	***MDA8 higher than the 77 ppb measured on June 21, 2015, occurred on only six days during 2009 to 2015.*** Time Series of MDA8 at UTEP. A value higher than the 77 ppb measured on June 21, 2015 was measured on only six days during the entire 7-year look-back period (one of those days was June 17, 2015).
5	19	***The highest MDA8 on a Sunday during the years 2009 to 2015 occurred on June 21, 2015, where the UTEP monitor measured 77 ppb.*** Same as Figure 4 but showing only Sunday data.
6	20	***MDA8 exceeded 70 ppb only one time, on any Sunday during June or July from 2009 to 2015, on June 21, 2015.*** Multi-year (2009 to 2015) seasonal MDA8 ozone plot for Sundays (right) and the other six days of the week (left).
7	21	***Ozone levels exceeded the 70 ppb ozone standard on only one Sunday, June 21, 2015. The second highest Sunday MDA8 ozone was 7 ppb lower, and was not an exceedance of the 2014 ozone standard.*** Distributional Ranking of MDA8 ozone for Sundays in June for the years 2011 to 2016. Wildfire impact is also evident on June 3, 2012, when the MDA8 measured 65 ppb.
8	22	***HMS Fire and Smoke Analyses for July 3, 2013, shows smoke covering much of the United States including El Paso and areas around El Paso.*** Image accessed from the NOAA Air Resources Laboratory FTP archive at ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/ (ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/20130703/hms.jpg)

Figure	Page	Description of Figure
9	23	***HMS Fire and Smoke Analyses for July 13, 2012, shows much of the United States including the desert Southwest and El Paso, covered with smoke.*** *Accessed from the NOAA Air Resources Laboratory FTP archive at ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/* (ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/20120713/hms.jpg)
10	24	***As the smoke dispersed over the steep mountainous terrain from June 18 to June 20, 2015, the plumes from the individual fires detached from the sources and coalesced into an irregularly shaped mass covering much of the southwestern portion of the U.S.*** HMS Fire and Smoke analyses images were accessed from the NOAA Air Resources Laboratory FTP archive at ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/ , with June 18, 19, and 20 from the following weblinks respectively: ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/20150618/hms.jpg ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/20150619/hms.jpg ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/20150620/hms.jpg
11	25	***Smoke mass from the fires spread out towards the east and into and beyond the Rio Grande Valley, towards White Sands, New Mexico.*** MODIS Aqua True Color Image for June 20, 2015.
12	26	***Smoke mass from the Whitetail Fire and other fires spread out towards the east and into and beyond the Rio Grande Valley, extending to White Sands, New Mexico, and to El Paso.*** MODIS Aqua True Color Image for June 21, 2015.
13	27	***Smoke plumes drifting toward the east are visible. The 500m trajectory connects El Paso with the Hog Fire, approximately 150 miles (~ 240 kilometers) to the west, while the 2000 m trajectory connects El Paso with the smoke mass over White Sands, approximately 70 miles to the north.*** Aqua MODIS image with HYSPLIT Backward Trajectories from 500m (Red), 1000m (Blue), and 2000m (Green) above UTEP on June 21, 2015. Surface and low level winds approach UTEP from the SE but regional and long-range transport winds are from the NW quadrant, turning clockwise with height.
14	28	***The peak aerosol optical depth measurement at White Sands, New Mexico, occurred on June 21, 2015, coinciding with arrival of the wildfire smoke mass.*** AERONET White Sands AOD for June 2015.
15	29	***Surface level winds from the southeast brought in pollution from south of the El Paso monitors, and at the same time, winds aloft carried ozone-rich air from the wildfires, from the north and west of the city.*** The 00Z and 12Z NWS Soundings from nearby Santa Teresa on June 21, 2015. Aloft winds at 00Z were northeasterly and northwesterly, while aloft winds at 12Z were southwesterly and northwesterly. The northerly winds provided favorable conditions for transporting the smoke seen in the satellite photographs of White Sands and any ozone or ozone precursors generated from the fires towards the UTEP monitor. Obtained from University of Wyoming, Department of Atmospheric Science, Upper Air Data, Sounding Data at: http://weather.uwyo.edu/upperair/sounding.html
16	30	***The lowest level trajectories approach El Paso from the southeast, consistent with southeasterly surface winds; however, the mid-level trajectories tend to approach El Paso more from the south and the 1000m trajectories approach from the west or northwest.*** Backward trajectories terminating at 100m (red lines), 500m (blue lines), and 1000m (green lines) above El Paso on high ozone days during 2012 to 2014. Obtained from EPA Ozone Designations Mapping Tool at https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=6a89e7170dd147b1852ec11ccb3880e8

Figure	Page	Description of Figure
17	31	***El Paso UTEP Ozone and $PM_{2.5}$ measurements peaked simultaneously, at mid-day, on June 21, 2015.***
18	32	***Las Cruces (New Mexico) Desert View Ozone and $PM_{2.5}$ measurements peaked simultaneously, at mid-day, on June 21, 2015.***
19	33	***Average Ozone and $PM_{2.5}$ diurnal profiles typically peak at opposite times of the day on typical days, shown here for June 2015.***
20	34	***CO peaked simultaneously with ozone on June 21, 2015, inconsistent with typical diurnal variation of CO.***
21	35	***The CO plume originated in the area of the fires and extended over El Paso.*** CO remote sensing data from June 21, 2015, obtained for 700 and 850 millibars, obtained from NASA Giovanni data visualization portal at http://giovanni.gsfc.nasa.gov/giovanni/.
22	36	***The UTEP monitor measured relatively low levels of NO_x on June 21, 2015, compared to typical NOx concentrations.***
23	37	***The aerosol absorption optical depth measurement over El Paso on June 21, 2015, shows the presence of elevated levels light-absorbing aerosol, possibly smoke.*** OMI aerosol optical absorption depth, obtained from NASA Giovanni data visualization portal at http://giovanni.gsfc.nasa.gov/giovanni/
24	38	***Smoke mass moved over White Sands on June 20, 2015, and over El Paso on June 21, 2015.*** MODIS AQUA and MODIS Terra True Color Image on June 20, 2015 and June 21, 2015. The fire locations are superimposed on the MODIS (TERRA) and MODIS (AQUA) true color visible image, accessed from University of Wisconsin, Space Science and Engineering Center MODIS Today website. http://ge.ssec.wisc.edu/modis-today/
25	39	***Photographs show the presence of haze on June 21, 2015, obscuring visibility of mountains and downtown area (near the UTEP monitor), compared to similar photographs taken on June 19, 2015.*** Obtained at TCEQ's Ranger Peak webcam site in El Paso, located at 1700 McKinley Ave, with permissions from TCEQ.
26	40	***Comparing June 17, another high ozone day but without smoke influence, to June 21, shows the presence of haze on June 21 but not on June 17. Furthermore, additional photos from the same camera show haze buildup from June 17, 2015 to June 21, where haze reached its peak, and then clearing on June 22.*** Obtained at TCEQ's Ranger Peak webcam site in El Paso, located at 1700 McKinley Ave, with permissions from TCEQ.
27	41	***Comparing June 17, another high ozone day but without smoke influence, to June 21, shows the presence of haze on June 21 but not on June 17.*** Obtained at TCEQ's Ranger Peak webcam site in El Paso, located at 1700 McKinley Ave, with permissions from TCEQ.

Figure 1. ***The Lake Fire produced a large smoke plume.*** NASA's Aqua satellite collected this natural-color image with the Moderate Resolution Imaging Spectroradiometer (MODIS) on June 18, 2015. Actively burning areas, detected by MODIS's thermal bands, are outlined in red http://www.nasa.gov/image-feature/goddard/lake-fire-in-california-burns-over-11000-acres .

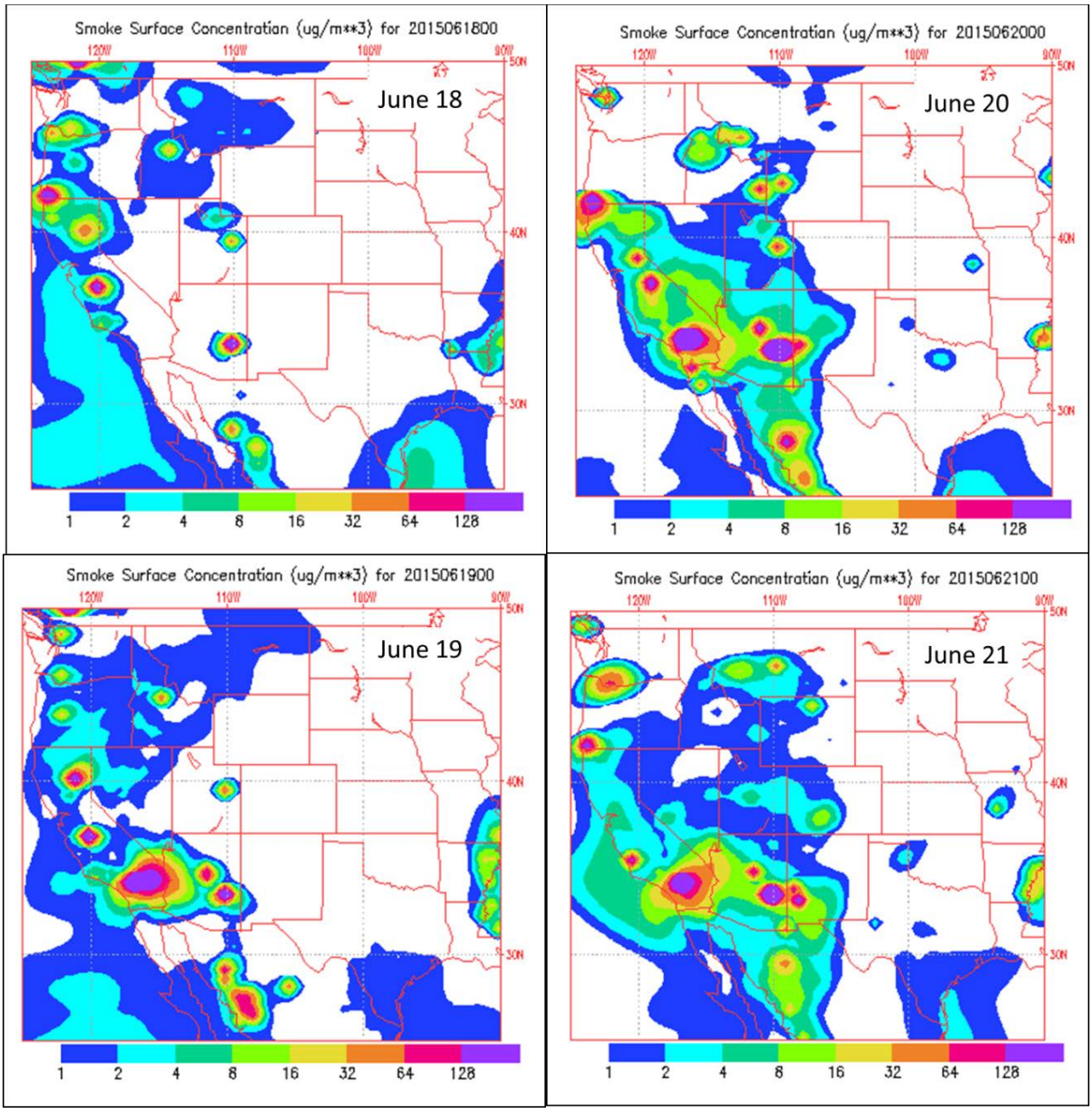


Figure 2. ***Individual smoke plumes merged into a regional smoke mass.*** Model simulation results by the Naval Research Laboratory (NRL) Navy Aerosol Analysis and Prediction System (NAAPS) illustrate the evolution and spread of the wildfire smoke toward El Paso. Archived model output was accessed on September 10, 2016 from http://www.nrlmry.navy.mil/aerosol/. On June 18 (top left) the NAAPS model simulates the near-field dispersion of the Whitetail Fire smoke mass in eastern Arizona. On June 19 (bottom left) NAAPS simulates the spread of smoke from the Whitetail fire toward the east into New Mexico and smoke from the Lake Fire into western Arizona. Smoke from the Horse Tank and Camillo fires are also indicated northwest of the Whitetail fire. On June 20 (top right) NAAPS projects the near-field dispersion of smoke from the Hog Fire near the Arizona and New Mexico border with Mexico and the Pinon and Moore Fires in Eastern NM. The simulated smoke covers Arizona and the entire eastern half of New Mexico as the individual plumes begin to merge into a regional mass. On June 21 (bottom right) the eastern edge of the simulated smoke mass stretches into west Texas and the individual fire plumes begin to lose their identities as they continue to coalesce.

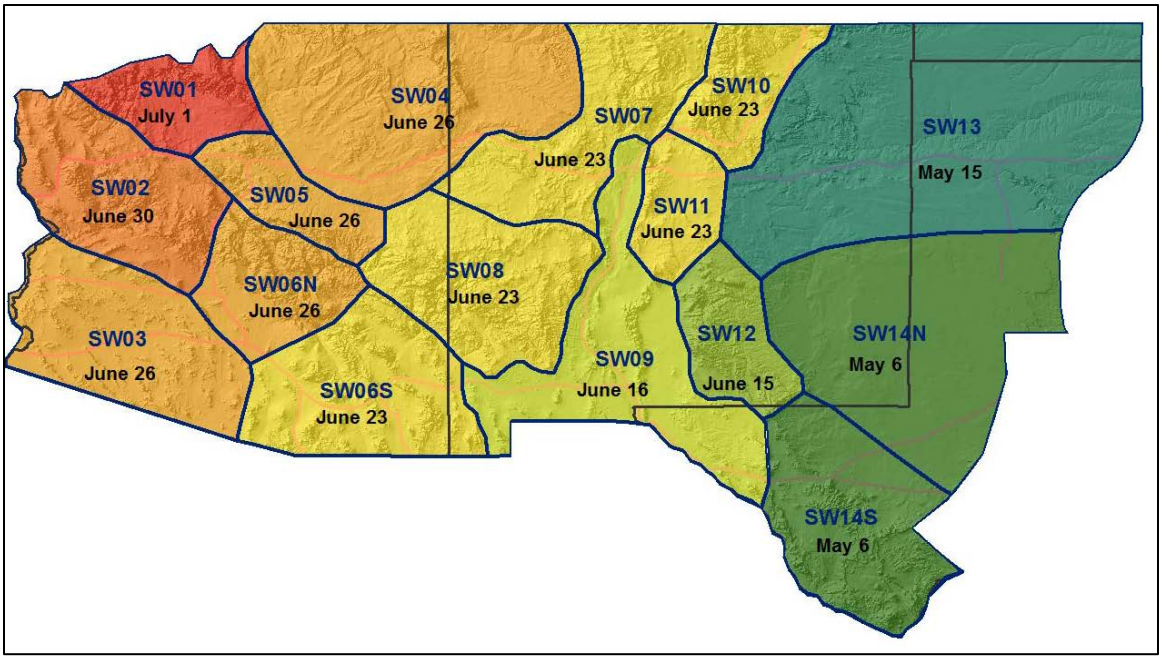


Figure 3. ***Peak fire season median dates in Arizona and New Mexico occur from mid-June until the first of July.*** Median Dates for "Peak Seasonal Fire Danger" from the National Interagency Fire Center obtained from National Interagency Fire Center (NIFC), Geographic Area Coordinating Group (GACG), Southwest Coordination Center (SWCC) at (http://gacc.nifc.gov/swcc/predictive/outlooks/peak_ending_timeframes/SW_season_timing.pdf)

Color scale: cool: earlier peak season time frames; warm: later peak season time frames

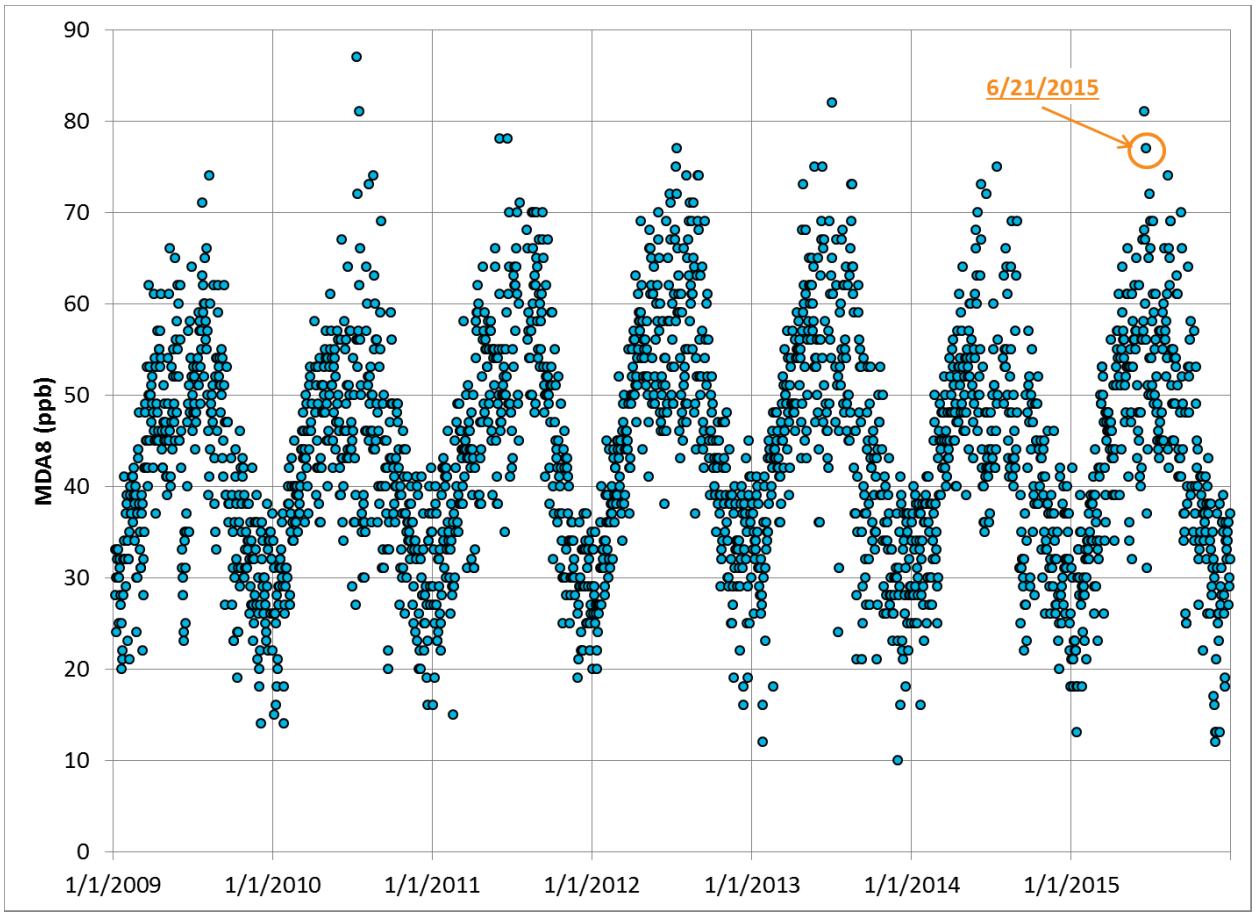


Figure 4. ***MDA8 higher than the 77 ppb measured on June 21, 2015, occurred on only six days during 2009 to 2015.*** Time Series of MDA8 at UTEP. A value higher than the 77 ppb measured on June 21, 2015 was measured on only six days during the entire 7-year look-back period (one of those days was June 17, 2015).

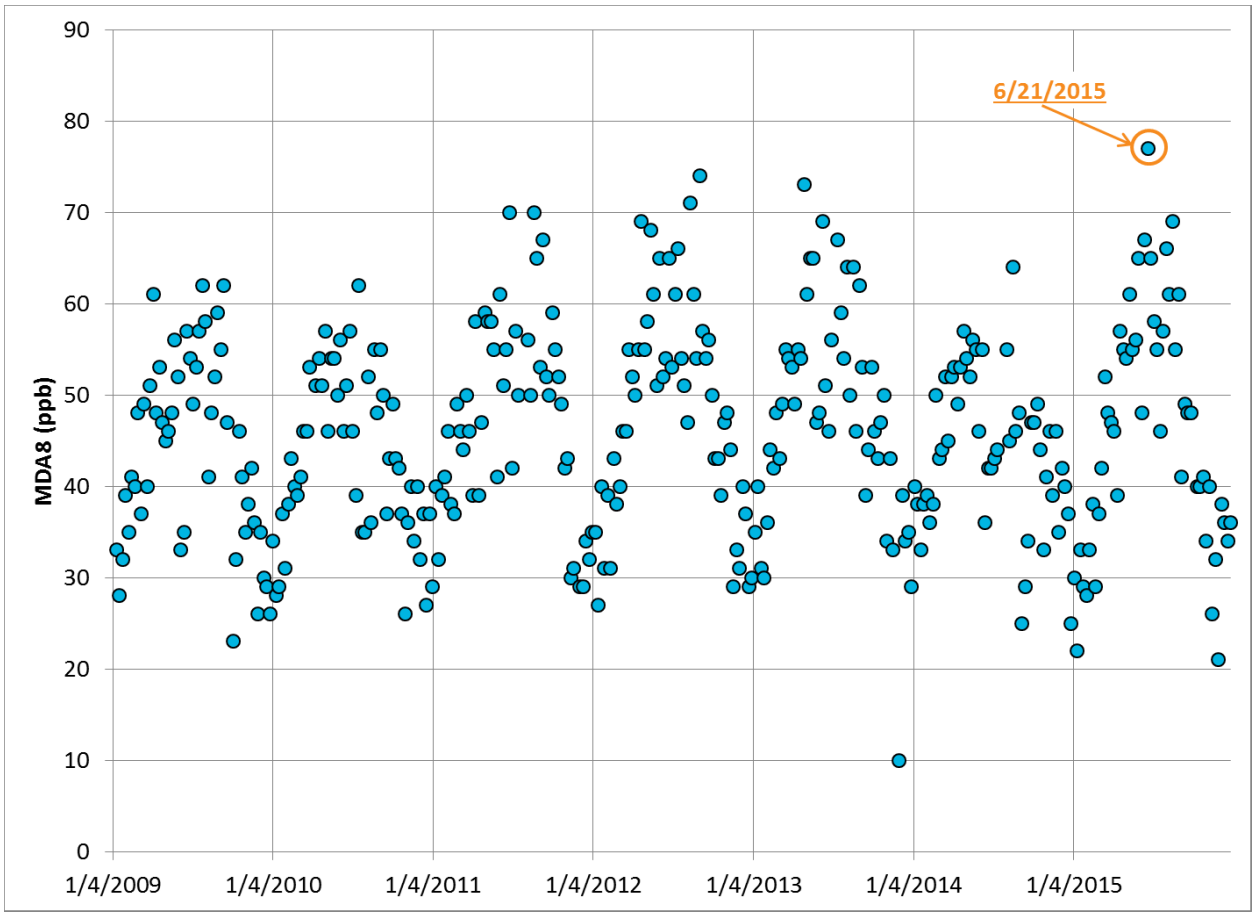


Figure 5. ***The highest MDA8 on a Sunday during the years 2009 to 2015 occurred on June 21, 2015, where the UTEP monitor measured 77 ppb.*** Same as Figure 4 but showing only Sunday data.

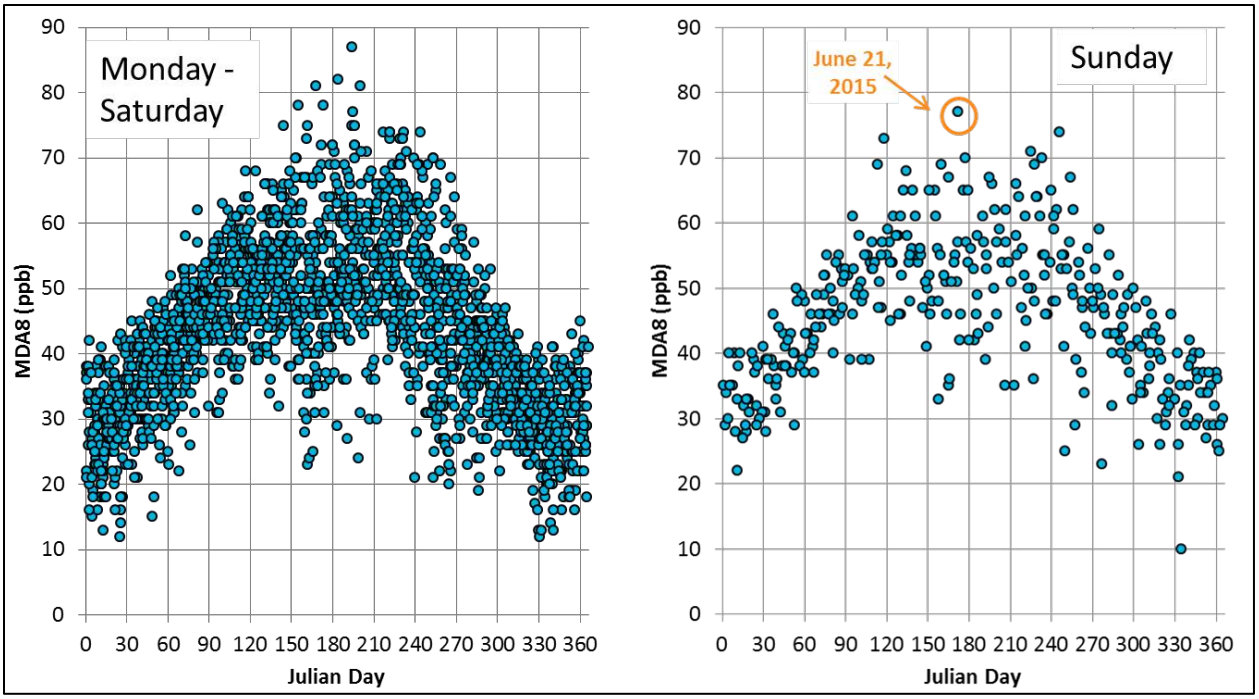


Figure 6. ***MDA8 exceeded 70 ppb only one time, on any Sunday during June or July from 2009 to 2015, on June 21, 2015.*** Multi-year (2009 to 2015) seasonal MDA8 ozone plot for Sundays (right) and the other six days of the week (left).

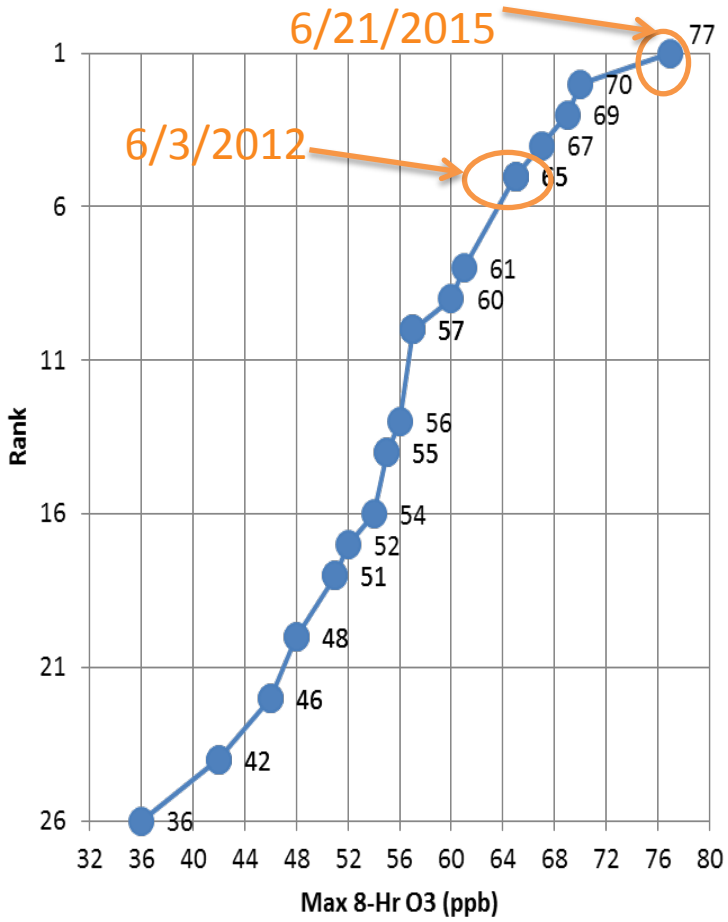


Figure 7. ***Ozone levels exceeded the 70 ppb ozone standard on only one Sunday, June 21, 2015. The second highest Sunday MDA8 ozone was 7 ppb lower, and was not an exceedance of the 2015 ozone standard.*** Distributional Ranking of MDA8 ozone for Sundays in June for the years 2011 to 2016. Wildfire impact is also evident on June 3, 2012, when the MDA8 measured 65 ppb.

Date	*Daily Max 8-hour Ozone Concentration*	*Rank*	*Percentile*
6/21/2015	**77**	**1**	**100.00%**
6/26/2011	**70**	**2**	**96.00%**
6/9/2013	**69**	**3**	**92.00%**
6/14/2015	**67**	**4**	**88.00%**
6/3/2012	**65**	**5**	**76.00%**

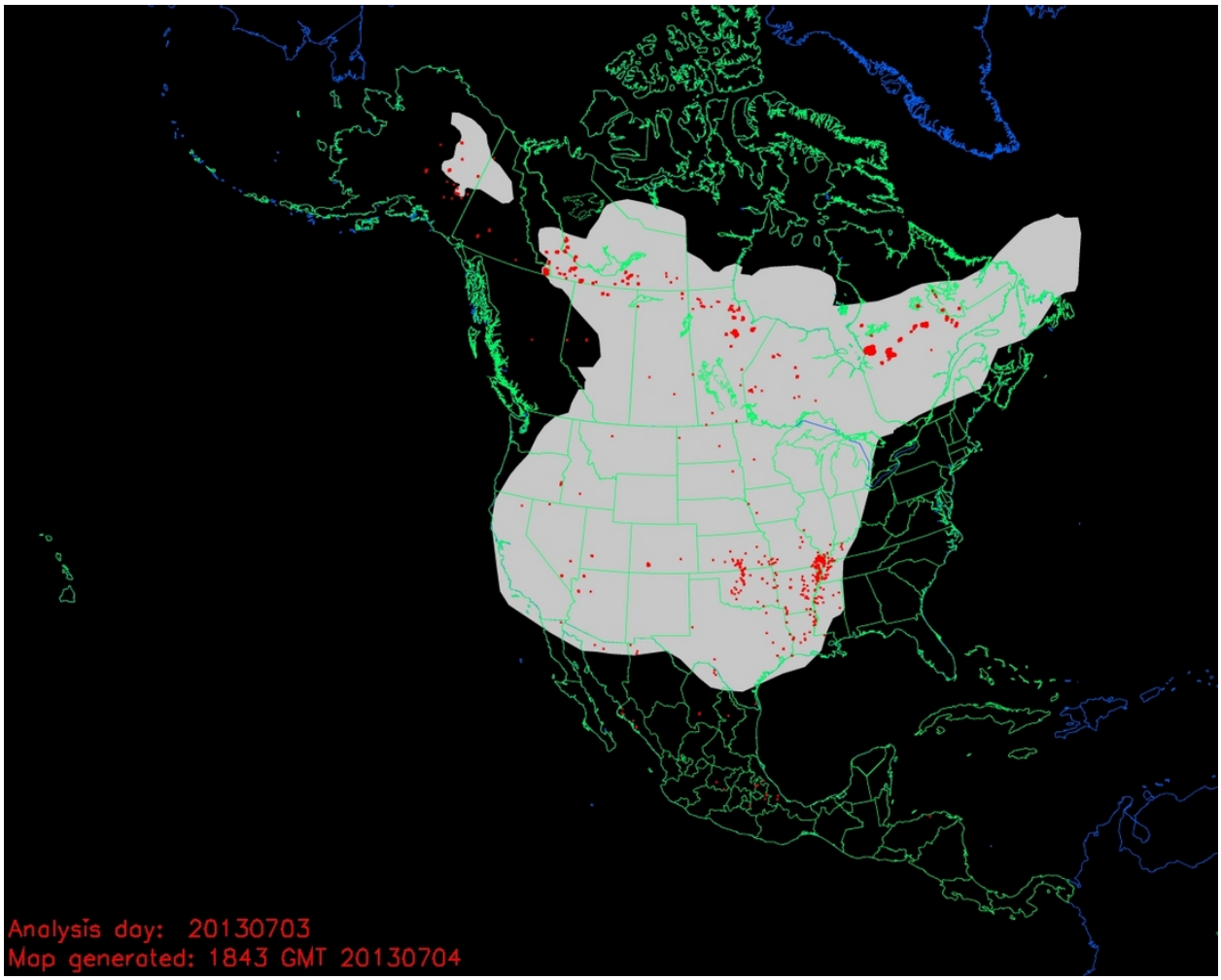


Figure 8. ***HMS Fire and Smoke Analyses for July 3, 2013, shows smoke covering much of the United States including El Paso and areas around El Paso.*** Image accessed from the NOAA Air Resources Laboratory FTP archive at ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/ (ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/20130703/hms.jpg)

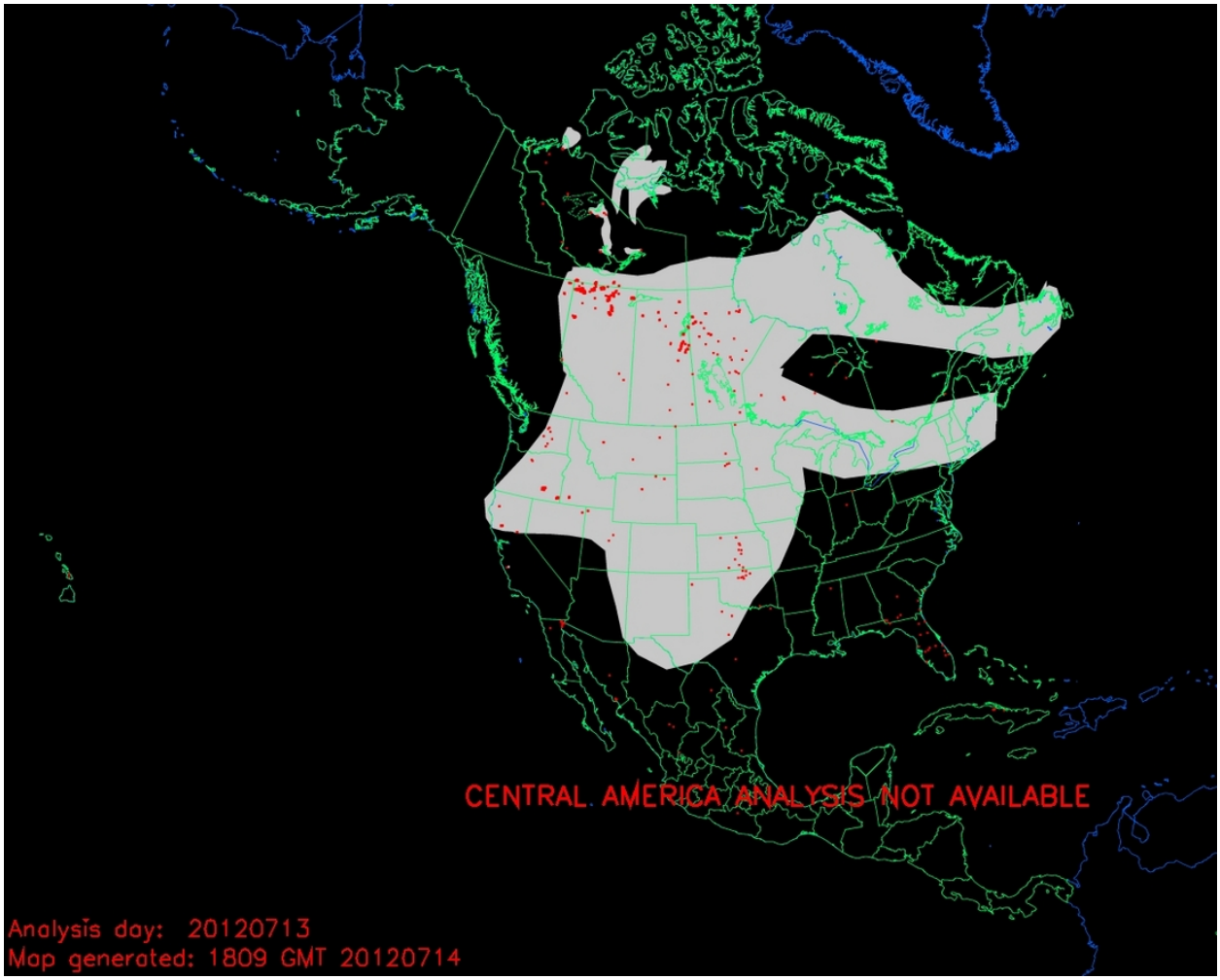
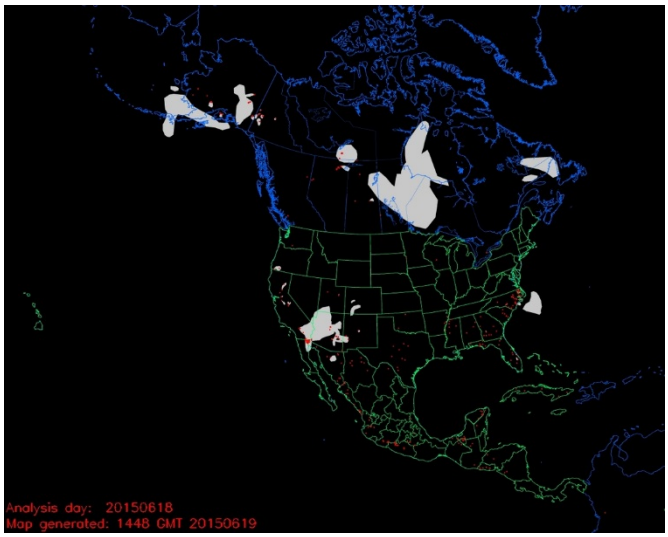
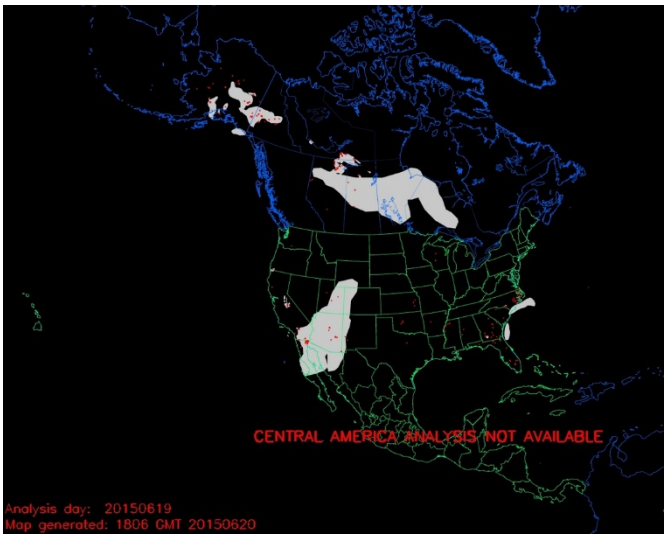


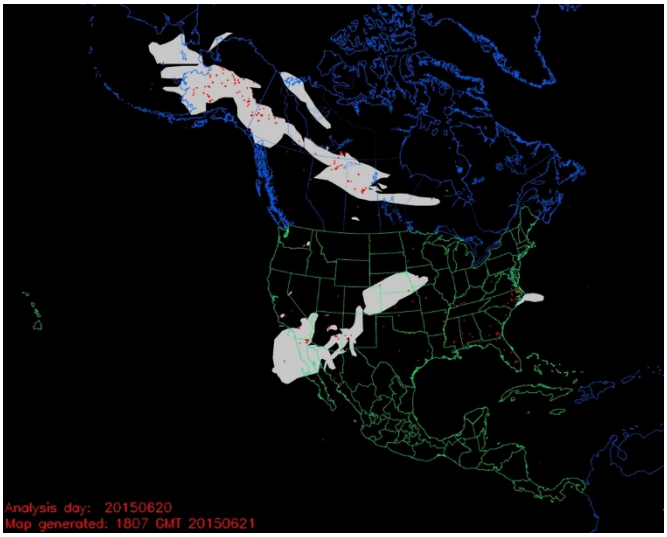
Figure 9. ***HMS Fire and Smoke Analyses for July 13, 2012, shows much of the United States including the desert Southwest and El Paso, covered with smoke.*** Accessed from the NOAA Air Resources Laboratory FTP archive at ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/ (ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/20120713/hms.jpg)



June 18, 2015



June 19, 2015



June 20, 2015

Figure 10. ***As the smoke dispersed over the steep mountainous terrain from June 18 to June 20, 2015, the plumes from the individual fires detached from the sources and coalesced into an irregularly shaped mass covering much of the southwestern portion of the U.S.*** HMS Fire and Smoke analyses images were accessed from the NOAA Air Resources Laboratory FTP archive at ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/ , with June 18, 19, and 20 from the following weblinks respectively:
ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/20150618/hms.jpg
ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/20150619/hms.jpg
ftp://arlftp.arlhq.noaa.gov/pub/archives/fires/national/arcweb/20150620/hms.jpg

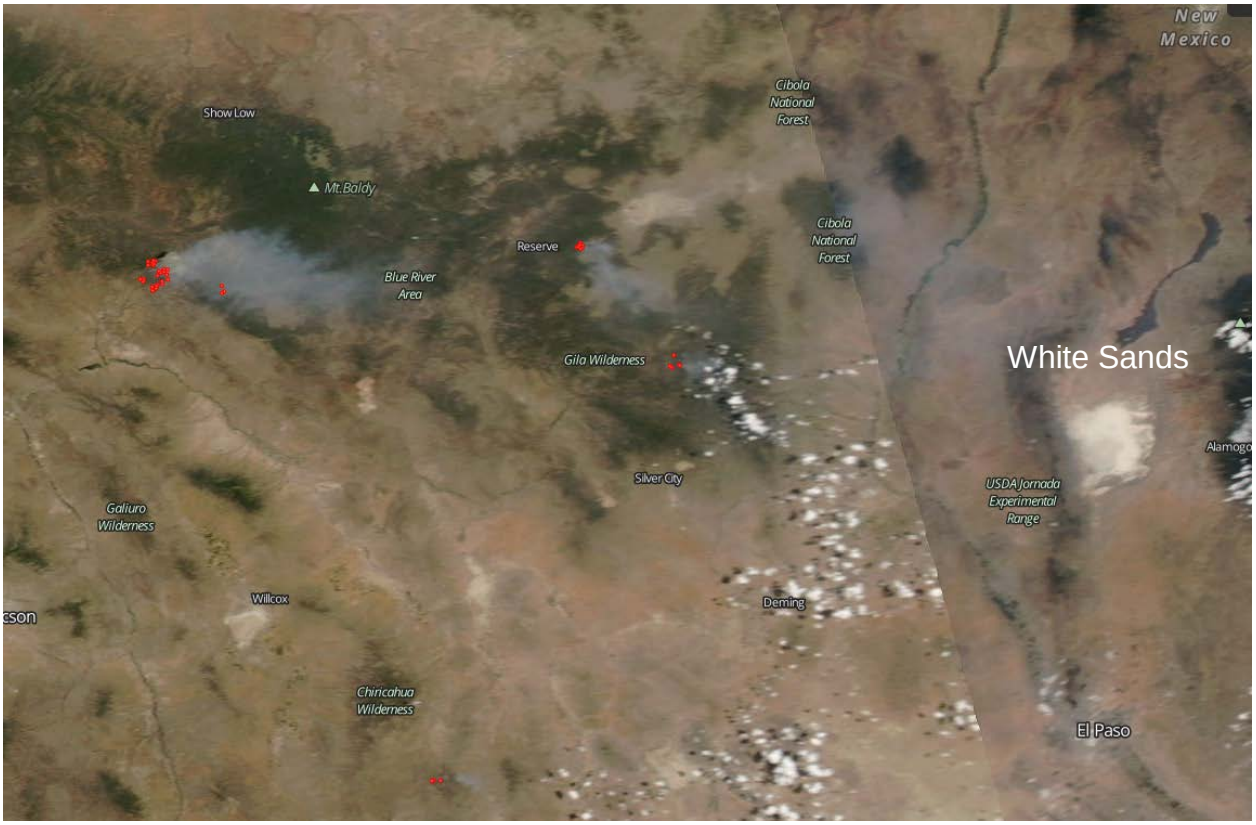


Figure 11. ***Smoke mass from the fires spread out towards the east and into and beyond the Rio Grande Valley, towards White Sands, New Mexico.*** MODIS Aqua True Color Image for June 20, 2015.

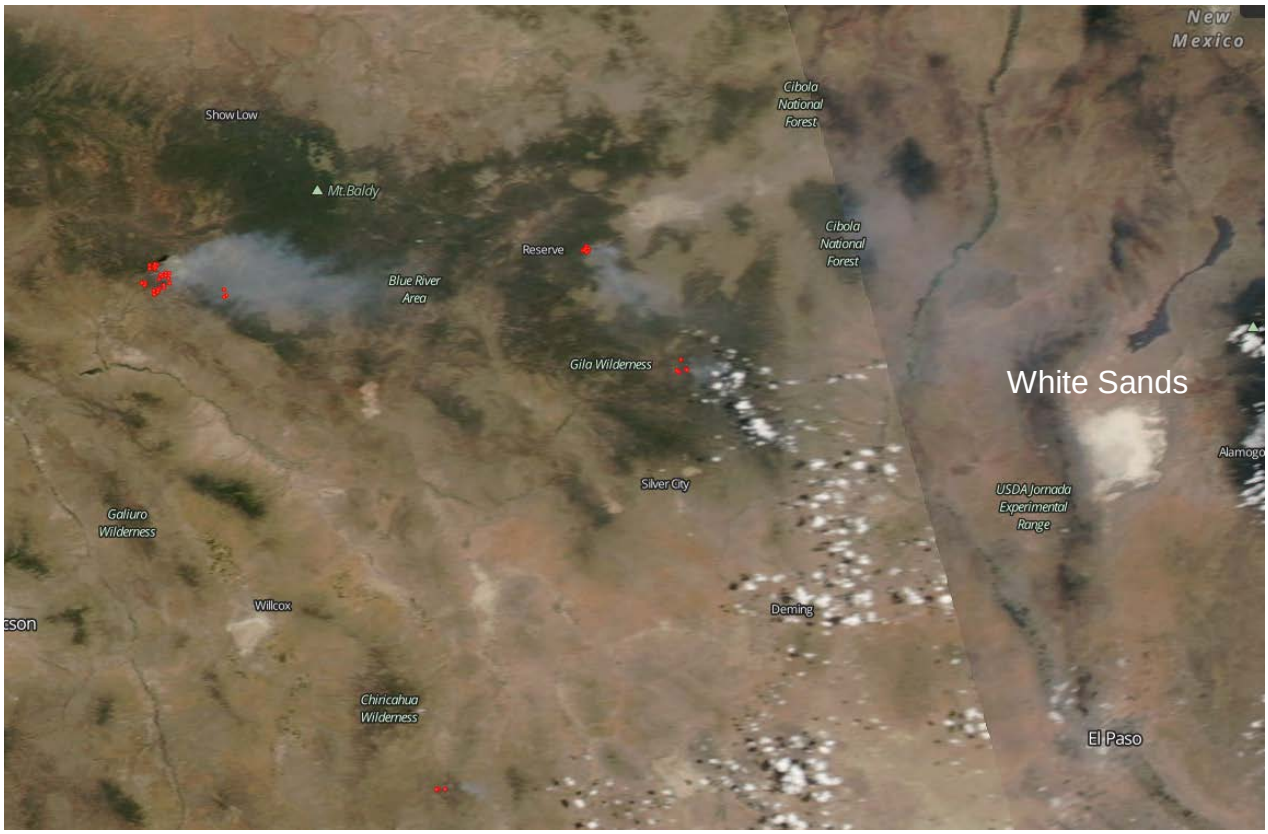


Figure 12. ***Smoke mass from the Whitetail Fire and other fires spread out towards the east and into and beyond the Rio Grande Valley, extending to White Sands, New Mexico, and to El Paso.*** MODIS Aqua True Color Image for June 21, 2015.

Figure 13. ***Smoke plumes drifting toward the east are visible. The 500m trajectory connects El Paso with the Hog Fire, approximately 150 miles (~ 240 kilometers) to the west, while the 2000 m trajectory connects El Paso with the smoke mass over White Sands, approximately 70 miles to the north.*** Aqua MODIS image with HYSPLIT Backward Trajectories from 500m (Red), 1000m (Blue), and 2000m (Green) above UTEP on June 21, 2015. Surface and low level winds approach UTEP from the SE but regional and long-range transport winds are from the NW quadrant, turning clockwise with height.

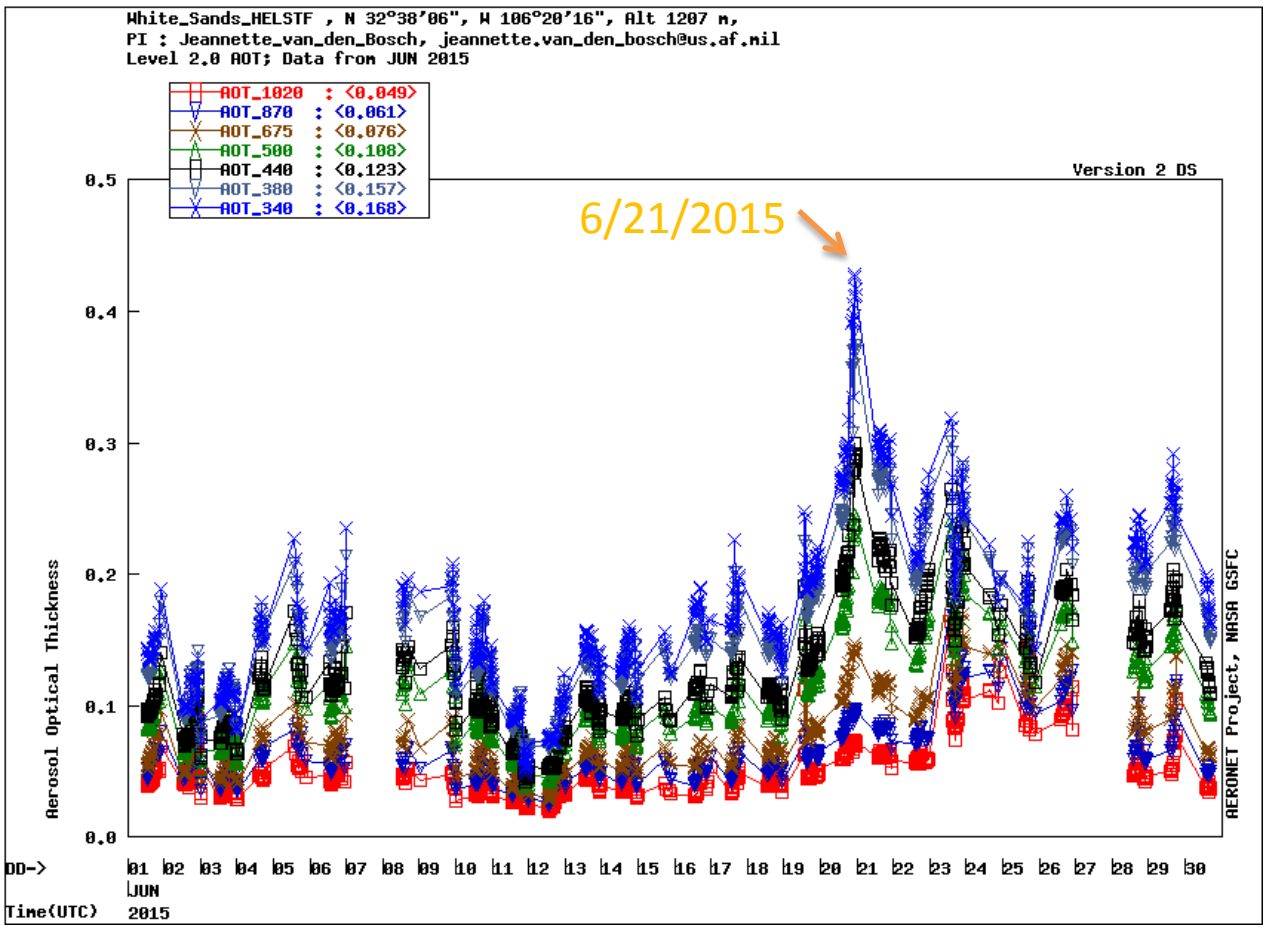


Figure 14. ***The peak aerosol optical depth measurement at White Sands, New Mexico, occurred on June 21, 2015, coinciding with arrival of the wildfire smoke mass.*** AERONET White Sands AOD for June 2015.

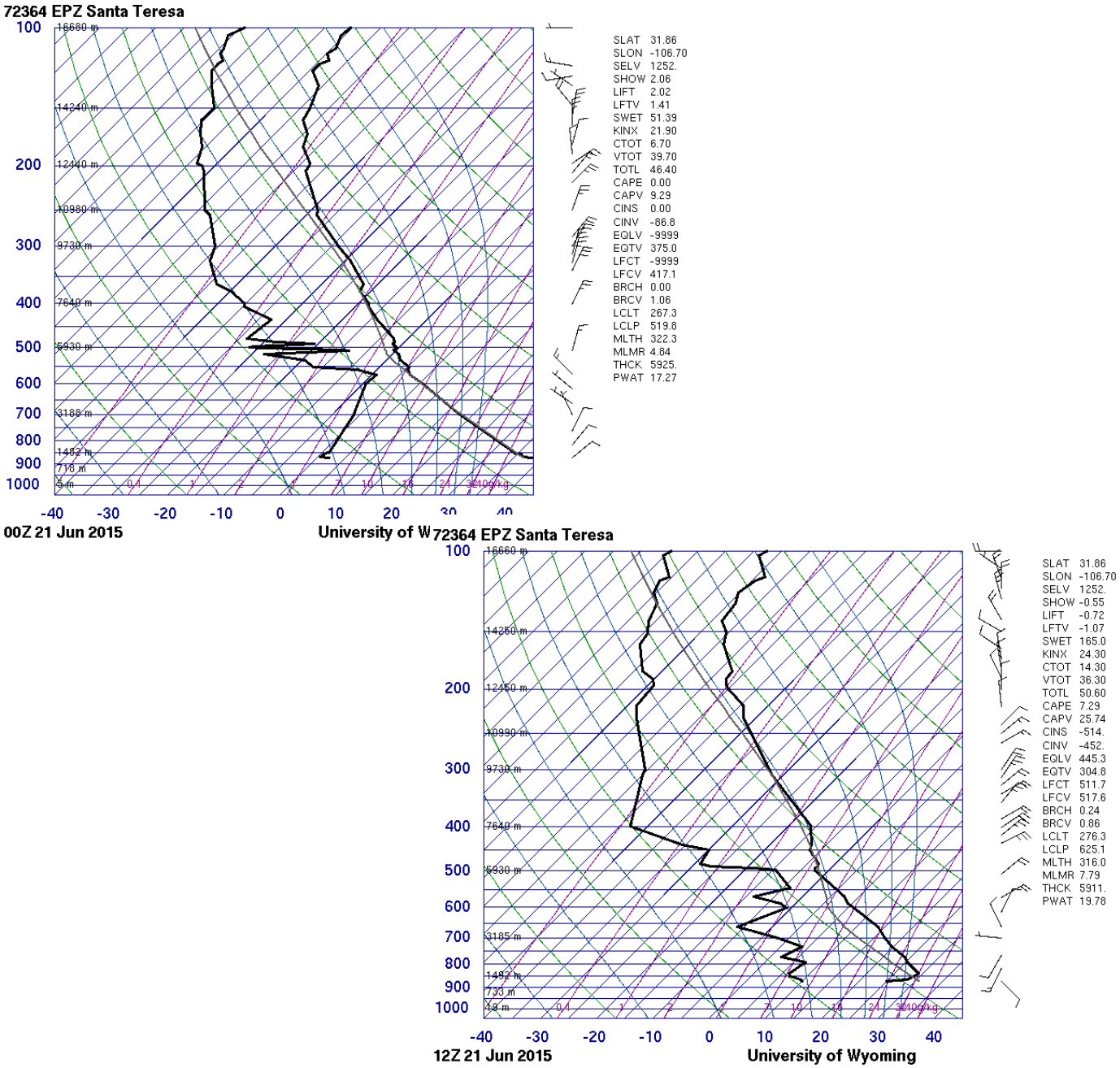


Figure 15. ***Surface level winds from the southeast brought in pollution from south of the El Paso monitors, and at the same time, winds aloft carried ozone-rich air from the wildfires, from the north and west of the city.*** The 00Z and 12Z NWS Soundings from nearby Santa Teresa on June 21, 2015. Aloft winds at 00Z were northeasterly and northwesterly, while aloft winds at 12Z were southwesterly and northwesterly. The northerly winds provided favorable conditions for transporting the smoke seen in the satellite photographs of White Sands and any ozone or ozone precursors generated from the fires towards the UTEP monitor. Obtained from University of Wyoming, Department of Atmospheric Science, Upper Air Data, Sounding Data at: http://weather.uwyo.edu/upperair/sounding.html

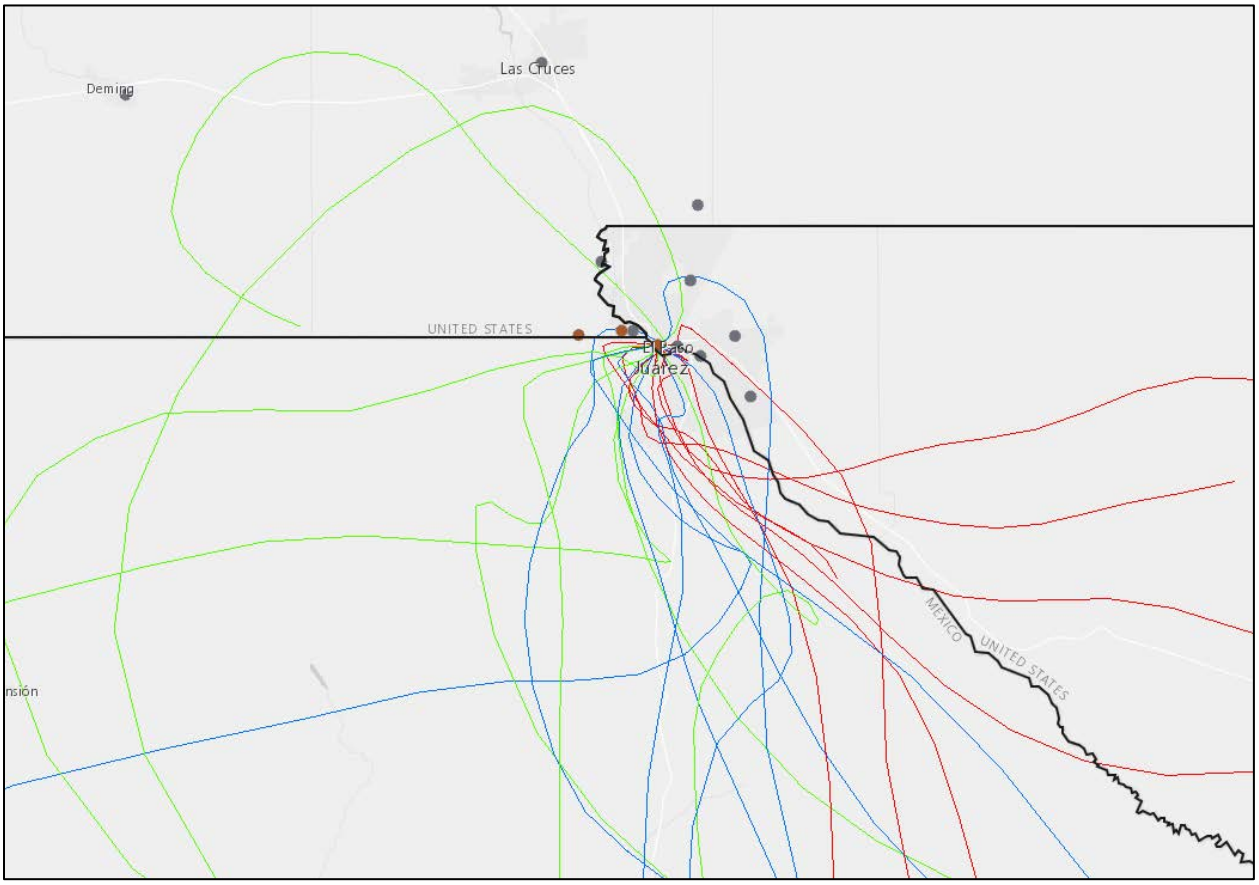


Figure 16. ***The lowest level trajectories approach El Paso from the southeast, consistent with southeasterly surface winds; however, the mid-level trajectories tend to approach El Paso more from the south and the 1000m trajectories approach from the west or northwest.*** Backward trajectories terminating at 100m (red lines), 500m (blue lines), and 1000m (green lines) above El Paso on high ozone days during 2012 to 2014. Obtained from EPA Ozone Designations Mapping Tool at https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=6a89e7170dd147b1852ec11ccb3880e8

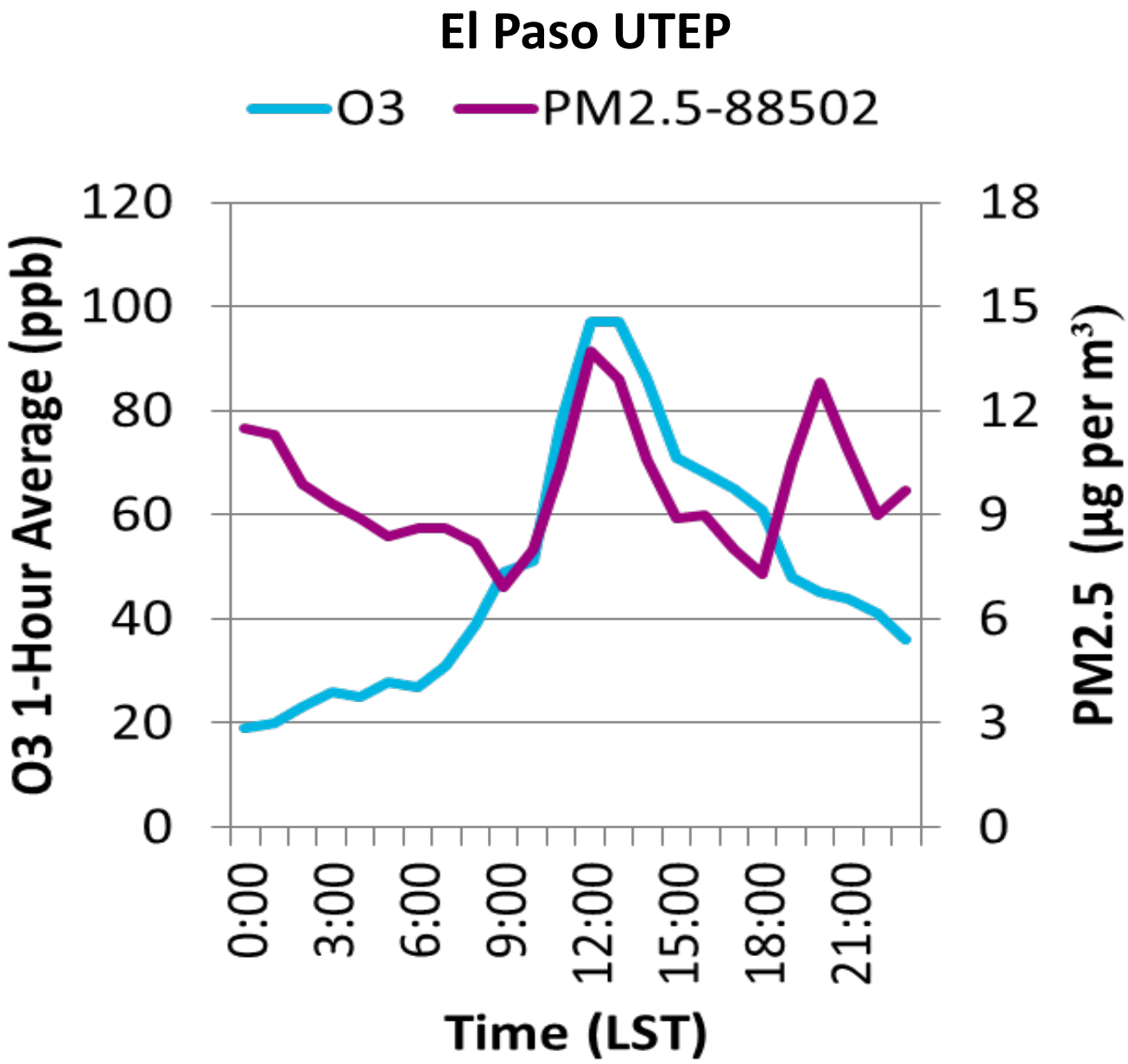


Figure 17. ***El Paso UTEP Ozone and $PM_{2.5}$ measurements peaked simultaneously, at mid-day, on June 21, 2015.***

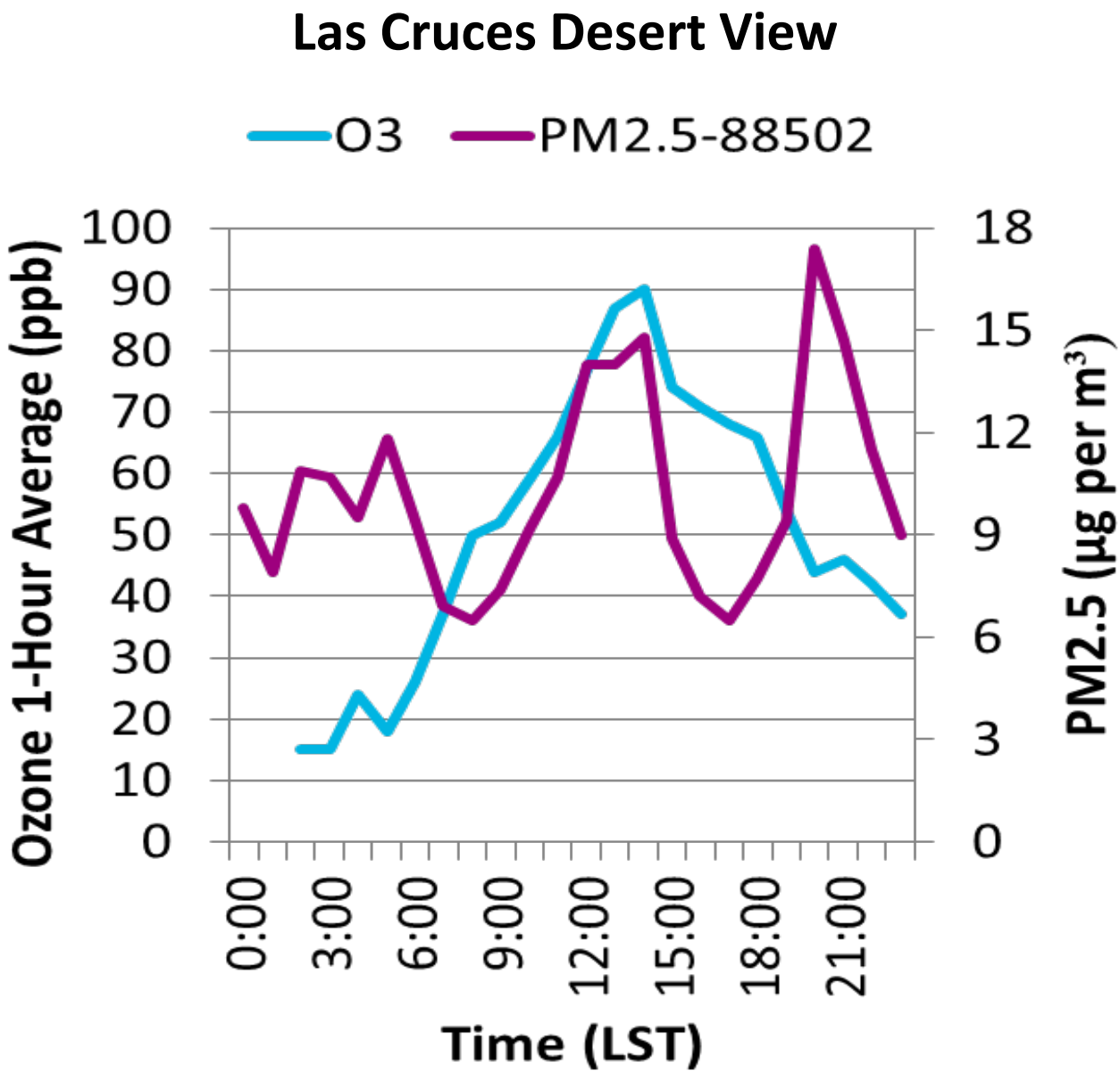


Figure 18. ***Las Cruces (New Mexico) Desert View Ozone and $PM_{2.5}$ measurements peaked simultaneously, at mid-day, on June 21, 2015.***

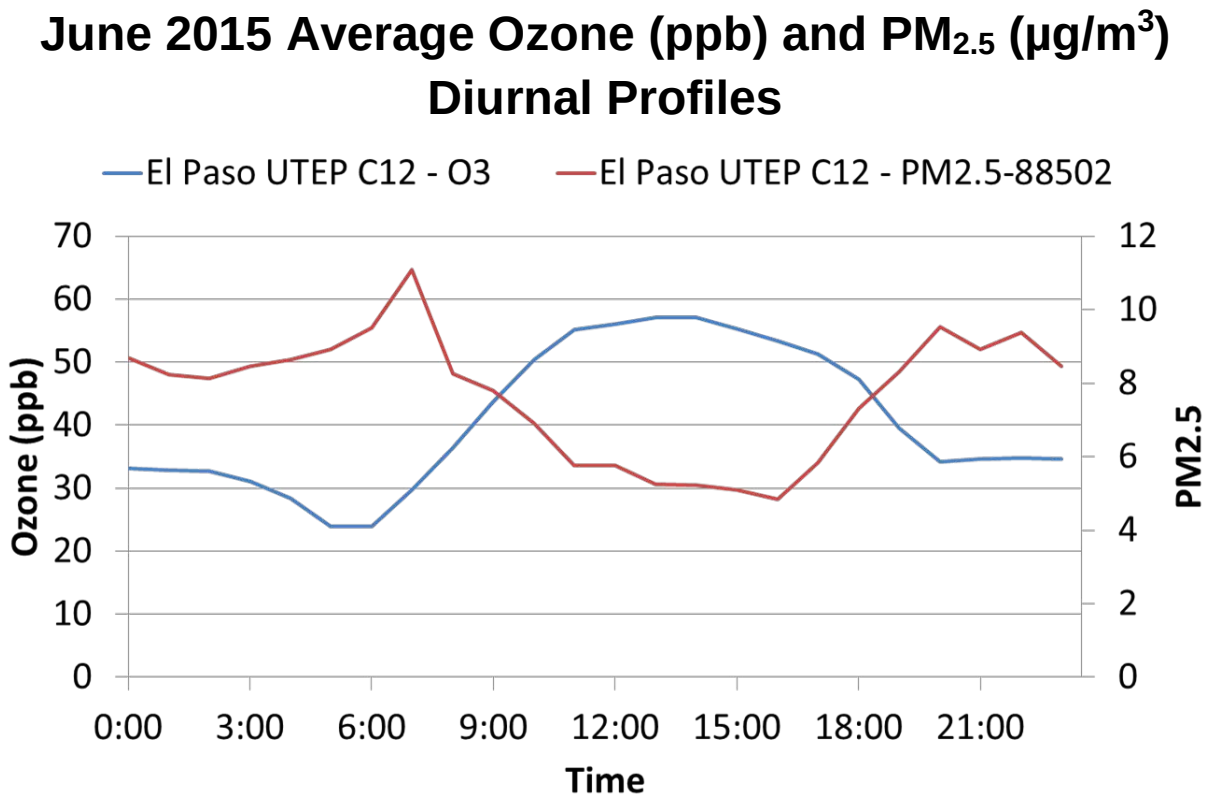


Figure 19. ***Average Ozone and $PM_{2.5}$ diurnal profiles typically peak at opposite times of the day on typical days, shown here for June 2015.***

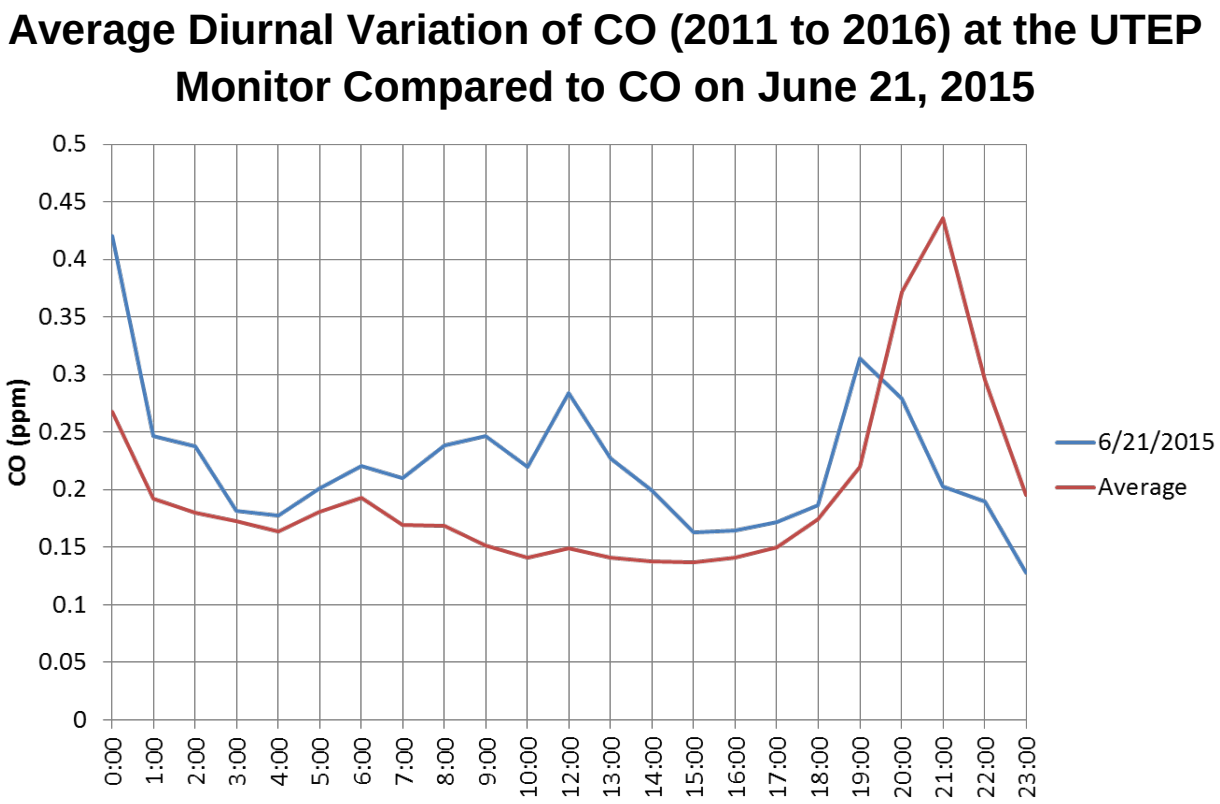
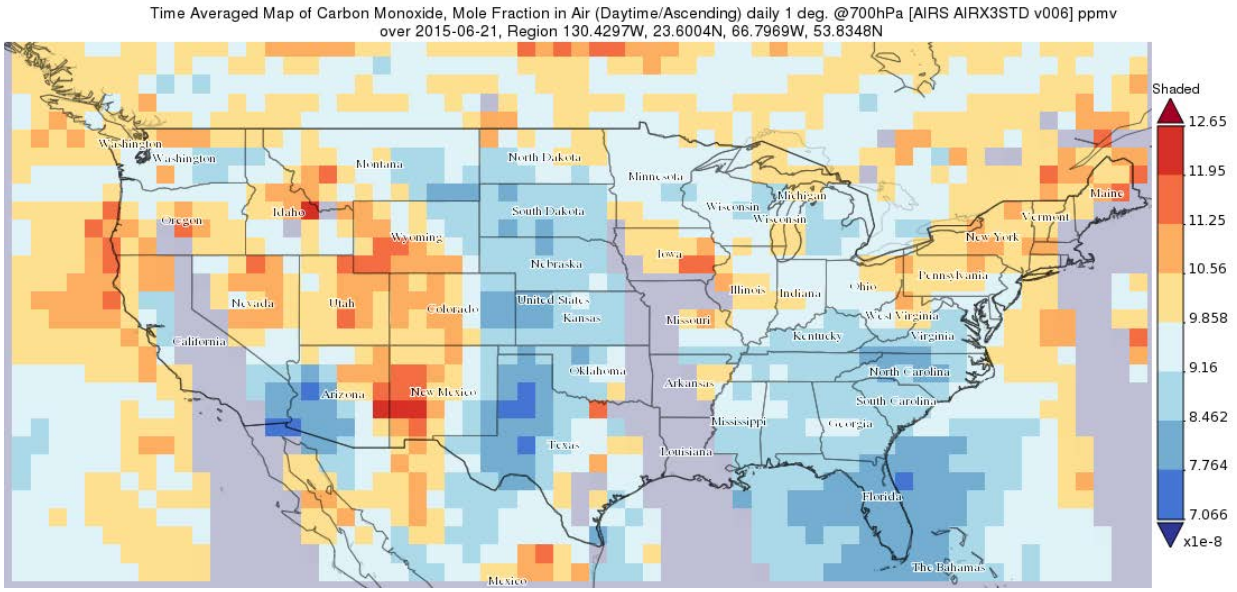
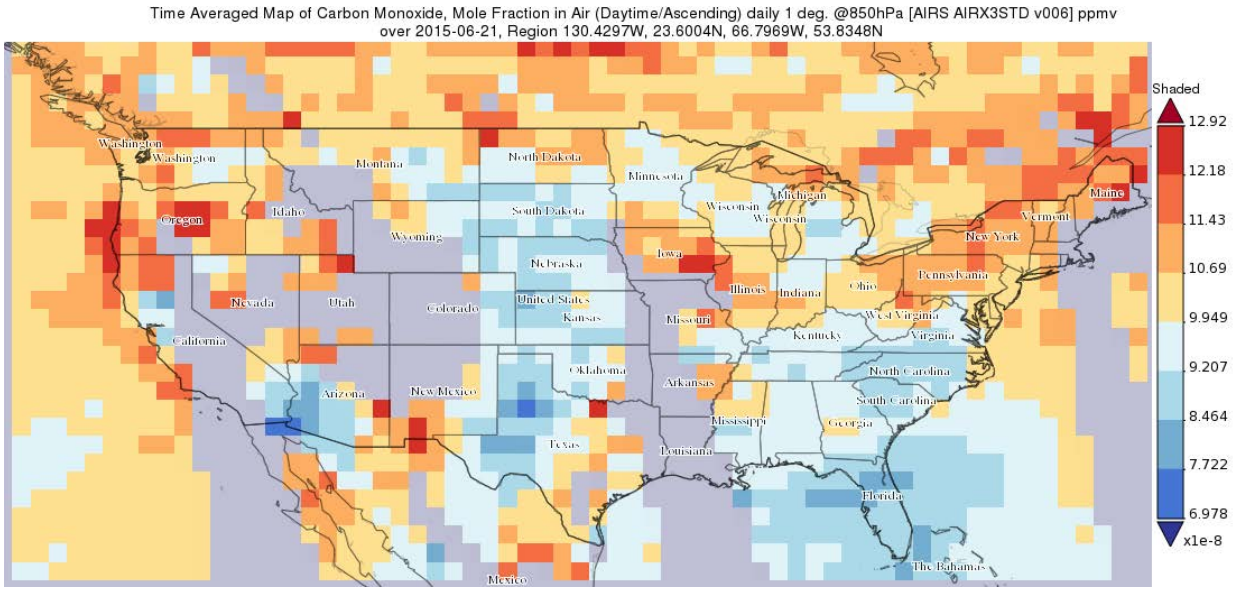


Figure 20. ***CO peaked simultaneously with ozone on June 21, 2015, inconsistent with typical diurnal variation of CO.***



700 millibars



850 millibars

Figure 21. ***The CO plume originated in the area of the fires and extended over El Paso.*** CO remote sensing data from June 21, 2015, obtained for 700 and 850 millibars, obtained from NASA Giovanni data visualization portal at http://giovanni.gsfc.nasa.gov/giovanni/.

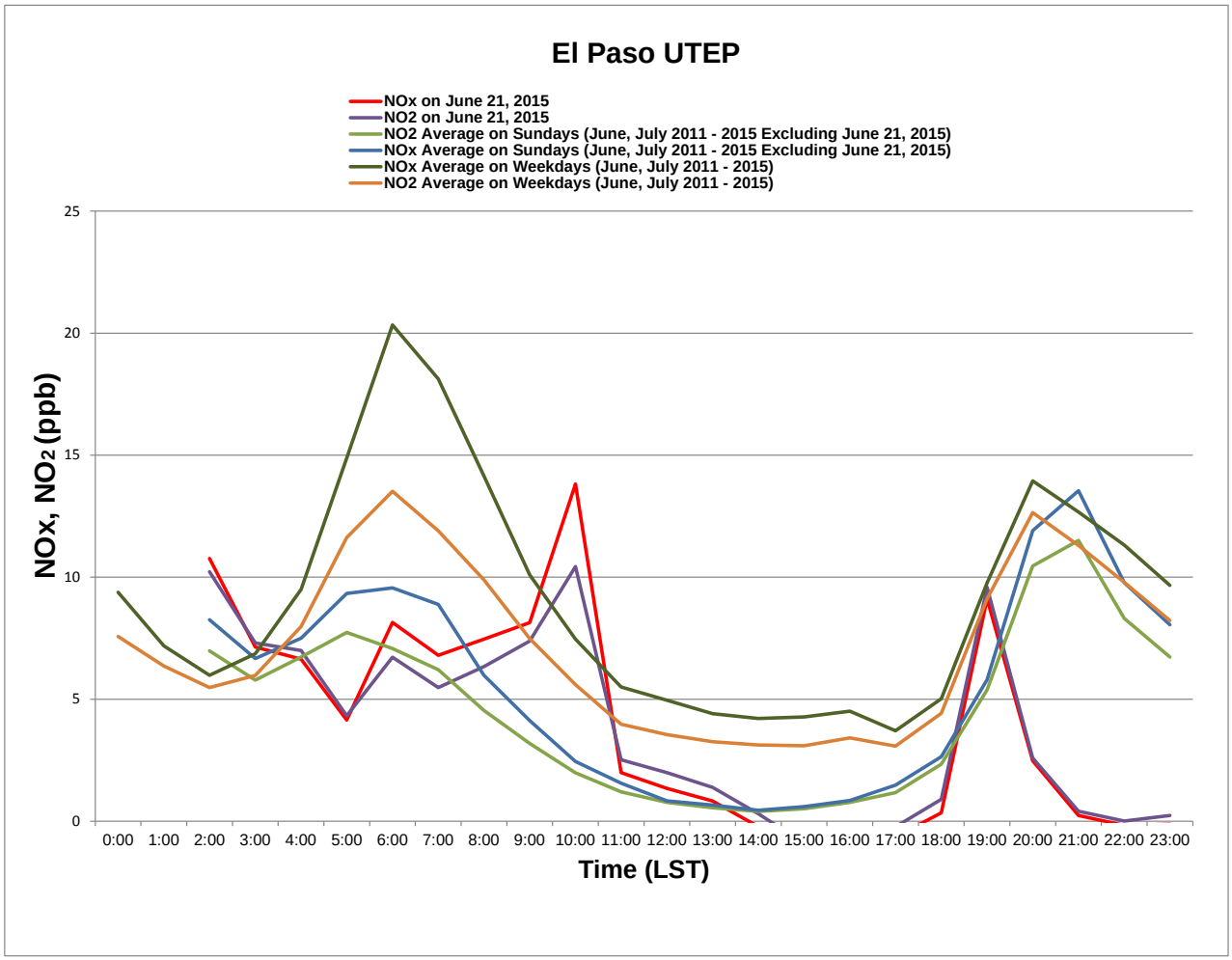


Figure 22. ***The UTEP monitor measured relatively low levels of NO_x on June 21, 2015, compared to typical NOx concentrations.***

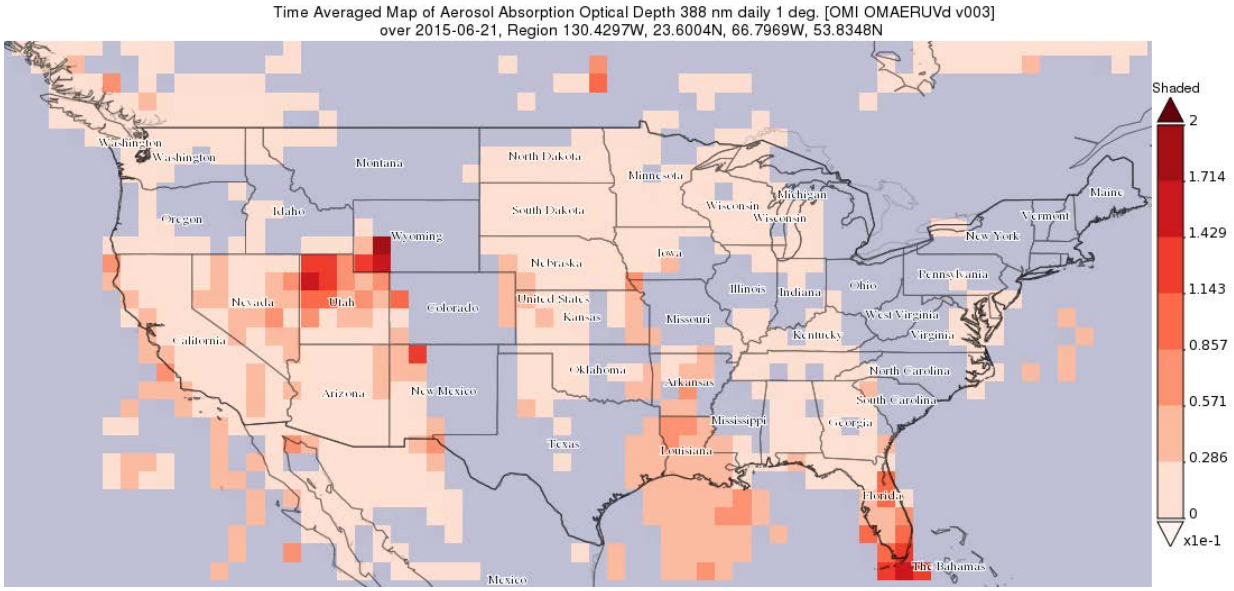
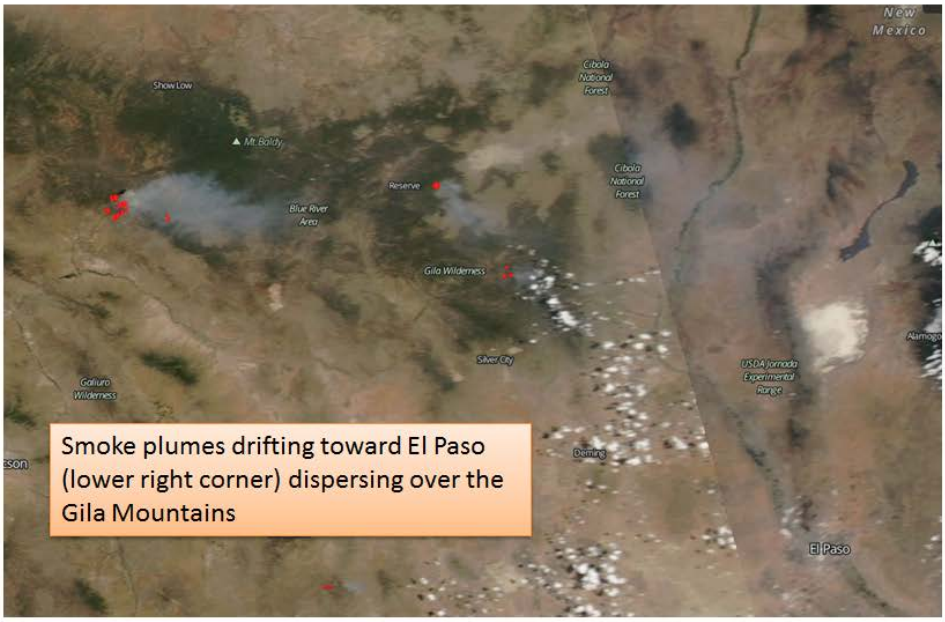


Figure 23. ***The aerosol absorption optical depth measurement over El Paso on June 21, 2015, shows the presence of elevated levels light-absorbing aerosol, possibly smoke.*** OMI aerosol optical absorption depth, obtained from NASA Giovanni data visualization portal at http://giovanni.gsfc.nasa.gov/giovanni/

MODIS Aqua True Color Image for 6/20/2015



MODIS Terra True Color Image for 6/21/2015

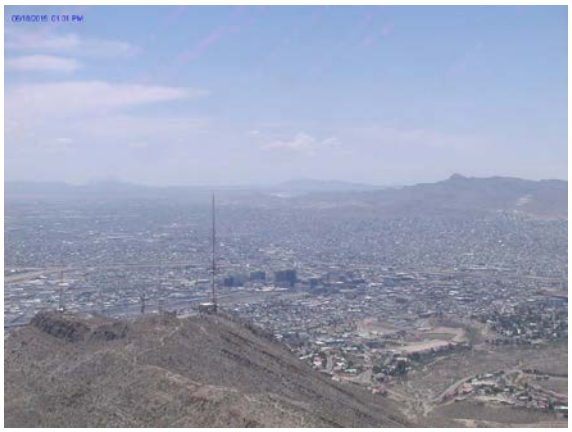
Figure 24. ***Smoke mass moved over White Sands on June 20, 2015, and over El Paso on June 21, 2015.*** MODIS AQUA and MODIS Terra True Color Image on June 20, 2015 and June 21, 2015. The fire locations are superimposed on the MODIS (TERRA) and MODIS (AQUA) true color visible image, accessed from University of Wisconsin, Space Science and Engineering Center MODIS Today website. http://ge.ssec.wisc.edu/modis-today/

June 19, 2015

June 21, 2015

Figure 25. ***Photographs show the presence of haze on June 21, 2015, obscuring visibility of mountains and downtown area (near the UTEP monitor), compared to similar photographs taken on June 19, 2015.*** Obtained at TCEQ's Ranger Peak webcam site in El Paso, located at 1700 McKinley Ave, with permissions from TCEQ.

June 17



June 18

June 19

June 20

June 21

June 22

Figure 26. ***Comparing June 17, another high ozone day but without smoke influence, to June 21, shows the presence of haze on June 21 but not on June 17. Furthermore, additional photos from the same camera show haze buildup from June 17, 2015 to June 21, where haze reached its peak, and then clearing on June 22.*** Obtained at TCEQ's Ranger Peak webcam site in El Paso, located at 1700 McKinley Ave, with permissions from TCEQ.

June 17

June 21

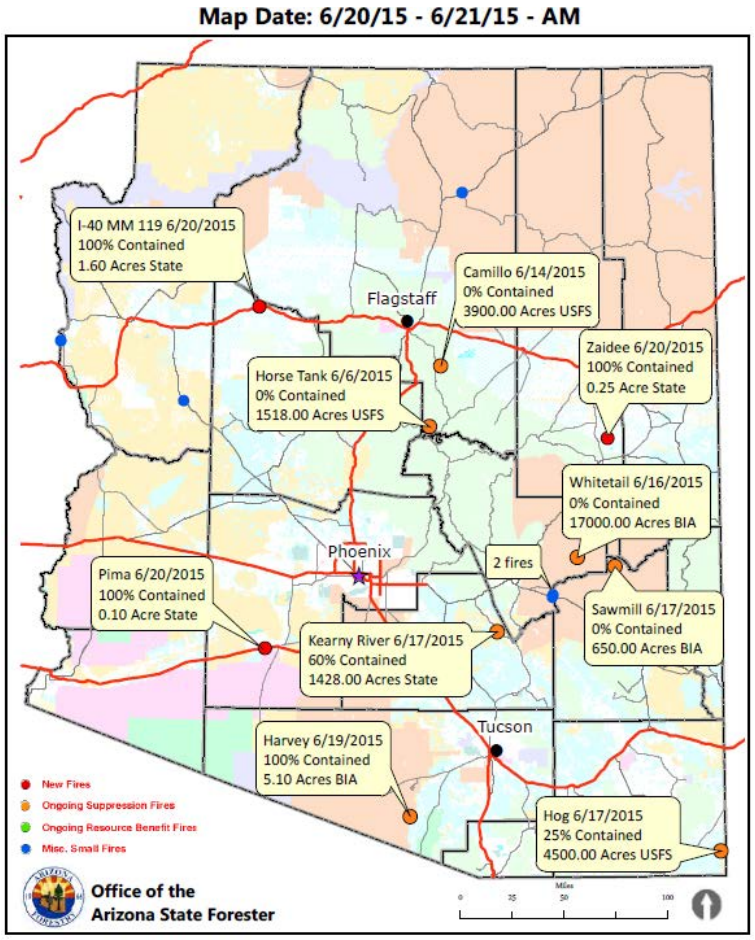
Figure 27. ***Comparing June 17, another high ozone day but without smoke influence, to June 21, shows the presence of haze on June 21 but not on June 17.*** Obtained at TCEQ's Ranger Peak webcam site in El Paso, located at 1700 McKinley Ave, with permissions from TCEQ.

Attachment 3

Wildfires Influencing El Paso Exceptional Event on

June 21, 2015

Map Showing Wildfires in Arizona on June 20 and June 21, 2015



Fire acreage may be based on estimates from overnight information (Infrared flights and other data sources) and may not have been verified. For official fire acreage and other information refer to http://inciweb.nwcg.gov or http://gacc.nifc.gov/swcc/.

Wildfire Update from U.S. Department of Agriculture, Forest Service

SILVER CITY, NM; June 21, 2015 – Hazy skies are clearing after smoke from wildfires across the region settled in local communities around the Gila National Forest overnight.

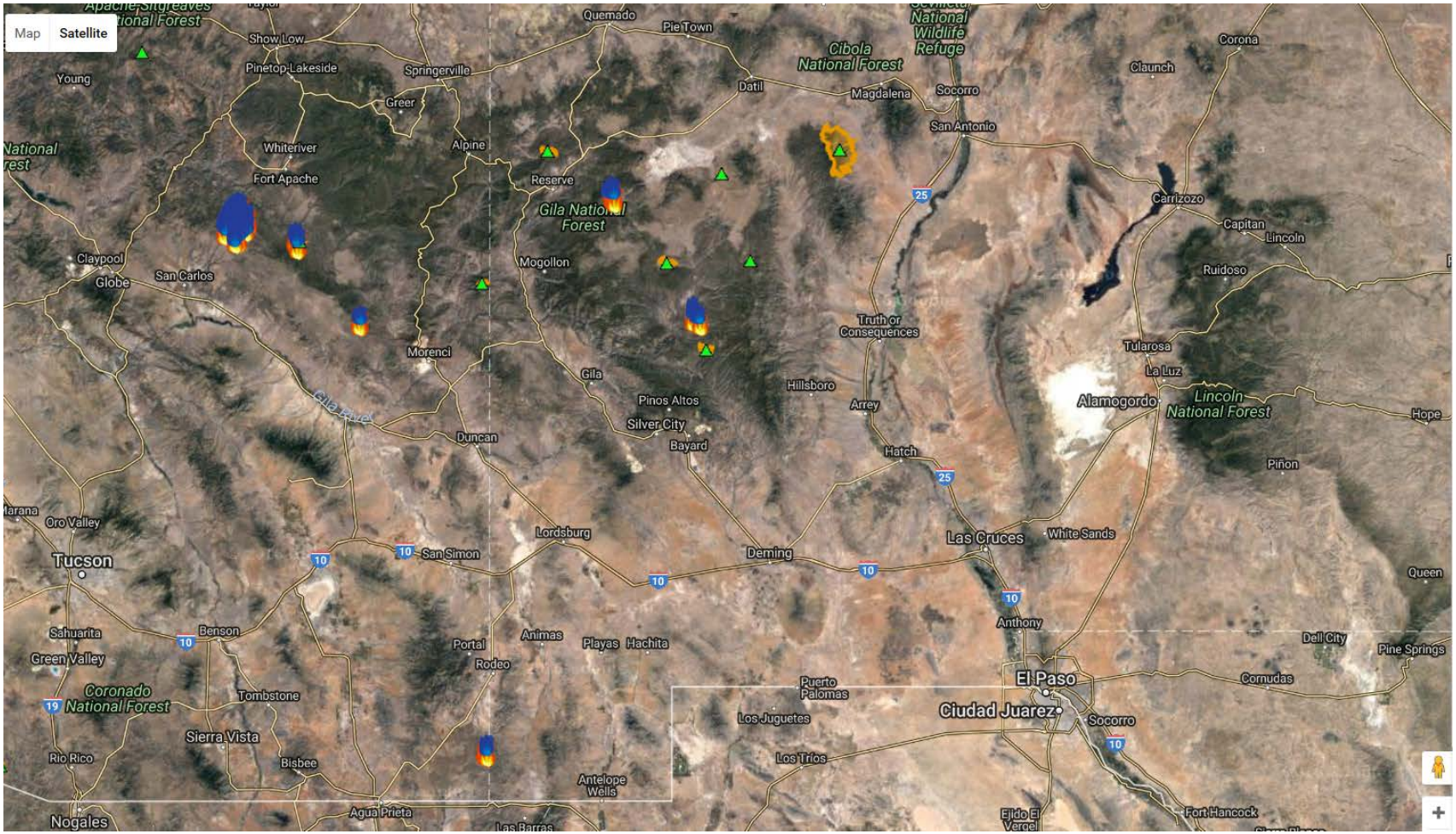
Several lightning-caused wildfires are being managed to achieve resource objectives on the Gila National Forest: Pinon Fire on the Reserve Ranger District (1,600 acres), Moore Fire on the Wilderness Ranger District (950 acres), and the Middle Fire on the Wilderness Ranger District (50 acres). The three fires are being used to remove hazardous fuels and reduce the risk of severe wildfire occurrence. Another fire on the Wilderness Ranger District (Woodrow, 100 acres) is being suppressed.

Fire managers are coordinating with the New Mexico Environment Department Air Quality Bureau to monitor smoke impacts during the management of these incidents.

Smoke production may increase at times and settle in communities during the management of these fires as the accumulation of forest debris and dead and down fuel is burned. Smoke from a large fire in Arizona may also contribute to the overall smoke accumulation over our communities. Visibility is an easy way to decide if it's okay to go outside. Using visibility and staying indoors when it is smoky outside is a way to protect your health.

Obtained from: http://www.fs.usda.gov/detail/gila/news-events/?cid=STELPRD3842155

6/21/2015 Active Fire Locations



VIIRS Active Fire Map, downloaded on 7/28/2016 from http://viirsfire.geog.umd.edu/map/map_v2.php

Lake Fire (CA)

Approximate Location

34.16 latitude, -116.893 longitude zoom to incident

Basic Information

Current as of	7/13/2016, 12:19:46 PM
Incident Type	Wildfire
Cause	Human Caused, Remains Under Investigation
Date of Origin	Wednesday June 17th, 2015 approx. 03:52 PM
Location	Barton Flats, South Fork, Fish Creek, Coon Creek, Ten Thousand Foot Ridge, Onyx Peak, Upper Pipes Canyon
Incident Commander	Peterson

Current Situation

Total Personnel	70
Size	31,359 Acres
Percent of Perimeter Contained	98%
Fuels Involved	Timber and brush with grass
Significant Events	There have been six minor firefighter injuries. One residence and three outbuildings have been determined to have been destroyed in the northeast portion of the fire. Damaged buildings have been assessed and confirmed by a Damage Inspection Team from San Bernardino County Fire Department

Lake Fire 6/17/2015 8:15 pm
Posted on 06/17/2015 10:17 pm

http://inciweb.nwcg.gov/incident/4302/

Red Canyon Fire (NM)

Approximate Location

33.756 latitude, -107.456 longitude zoom to incident

Basic Information

Current as of	7/16/2015, 4:05:54 PM
Incident Type	Wildfire
Cause	Lightning/natural
Date of Origin	Monday June 15th, 2015 approx. 11:30 AM
Location	San Mateo Mountains, 2 miles south of Grassy Lookout and 27 miles southwest of Magdalena, NM
Incident Commander	M.Martinez
Incident Description	Wf

Current Situation

Total Personnel	9
Size	17,843 Acres
Fuels Involved	Timber (grass and understory) short grass (1 foot) and closed timber litter

http://inciweb.nwcg.gov/incident/4311

Hog Fire (NM)

Hog Fire

Incident Information | Announcements | Closures | News | Ph

This incident is no longer being updated.

INCIDENT UPDATED 6/25/2015

Approximate Location

31.503 latitude, -109.089 longitude zoom to incident

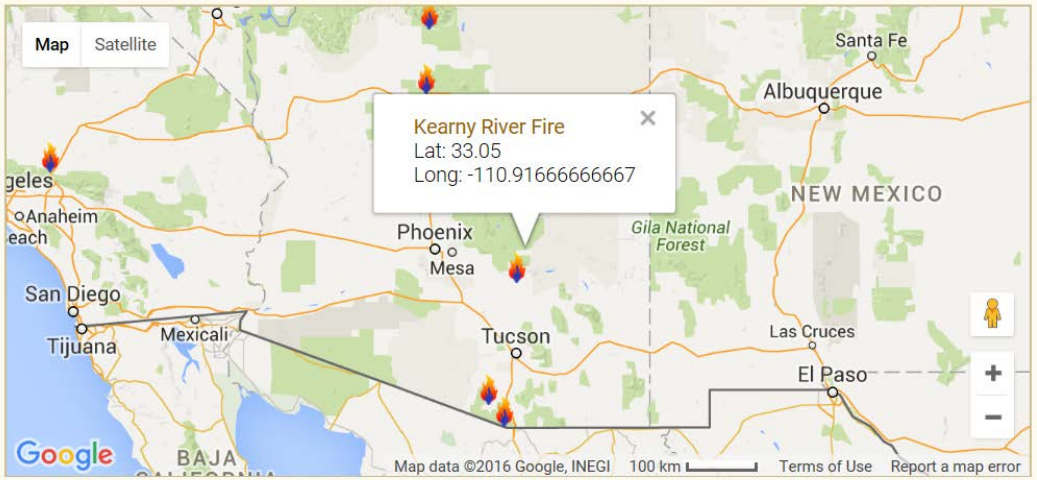
Basic Information	
Current as of	6/24/2015 1:39:20 PM
Incident Type	Wildfire
Cause	Lightning
Date of Origin	Wednesday June 17th, 2015 approx. 06:00 AM
Location	On Coronado National Forest lands spanning both sides of the Arizona/New Mexico state line in Cochise and Hidalgo Counties.
Incident Commander	Travis Stanfill
Incident Description	Hog Canyon

Current Situation	
Total Personnel	80
Size	8,000 Acres
Percent of Perimeter Contained	50%
Estimated Containment Date	Saturday June 27th, 2015 approx. 12:00 AM
Fuels Involved	Grass, brush, mesquite

Kearny River Fire (AZ)

Approximate Location

33.05 latitude, -110.917 longitude zoom to incident



Basic Information

Current as of	6/27/2015 8:35:29 PM
Incident Type	Wildfire
Cause	Under Investigation
Date of Origin	Wednesday June 17th, 2015 approx. 11:03 AM
Location	Kearny, AZ
Incident Commander	Bryan Heun/Arizona State Forestry
Incident Description	Type 4 Incident

Current Situation

Total Personnel	44
Size	1,428 Acres

http://inciweb.nwcg.gov/incident/4299/

Kearny River Fire 6/17/2015 3:30 pm
Posted on: 06/17/15 05:51 pm

Moore Fire (NM)

Approximate Location

33.212 latitude, -108.102 longitude zoom to incident

Incident Overview

The lightning-caused Moore Fire was detected on June 16, 2015 and is located seven miles east of Gila Hot Springs in the Gila Wilderness on the Wilderness Ranger District. With more extensive aerial mapping the fire has burned 3670 acres. The resource objectives that fire managers are working to achieve on this incident include: allow natural fire to resume its role as a disturbance factor in the ecosystem, improve forest health, and reduce the potential for high severity wildfires in future years.

Image options: [Enlarge] [Full Size]

http://inciweb.nwcg.gov/incident/4296/

Air Quality Information

Incident: Moore Fire Wildfire
Released: 6/21/2015

Smoke production may increase at times and settle in communities during the management of this fire as forest debris and dead and down fuel is burned. Smoke from a large fire in Arizona may also contribute to the overall accumulation of smoke over our communities. Visibility is an easy way to decide if it's okay to go outside. Using visibility and staying indoors when it is smoky outside is a way to protect your health. The New Mexico Department of Health explains how to use a visibility test to determine smoke impacts in your area on their website at: https://nmtracking.org/en/environ_exposure/fire-and-smoke/#xEPHT__fivemile__1329

Basic Information

Current as of	6/28/2015 4:20:50 PM
Incident Type	Wildfire
Cause	Lightning
Date of Origin	Tuesday June 16th, 2015 approx. 02:00 PM
Location	Tom Moore Mesa, Gila Wilderness, approximately 7 miles ea
Incident Commander	Holguin
Incident Description	Wildland Fire For Multiple Objectives

Additional Documentation for Moore Fire Provides Supporting Evidence

Pinon Fire (NM)

33.7 latitude, -108.767 longitude zoom to incident

Pinon Fire 6/20/15
Posted on: 06/20/15 07:25 pm

Incident Overview

The Pinon Fire is 15 miles east of Reserve, NM on the Reserve Ranger District. It is approximately 3,300 acres. Since it started by lighting June 16, it has been used to thin the forest, remove hazardous fuels, and return fire to the ecosystem. It has been placed in monitor status.

http://inciweb.nwcg.gov/incident/4297/

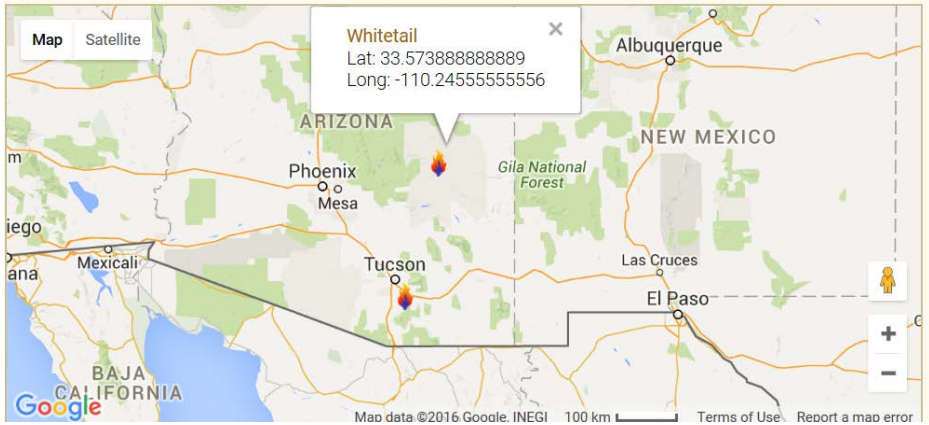
Basic Information

Current as of	6/27/2015 1:08:10 PM
Incident Type	Wildfire
Cause	Lightning
Date of Origin	Tuesday June 16th, 2015 approx. 02:00 PM
Location	East of Eagle Peak on the Reserve Ranger District
Incident Commander	Richards
Incident Description	Wildland Fire Managed For Multiple Resource Objectives

Whitetail and Sawmill Fires (AZ)

Approximate Location

33.574 latitude, -110.246 longitude zoom to incident



Basic Information

Current as of	6/29/2015 7:53:05 PM
Incident Type	Wildfire
Cause	Lightning
Date of Origin	Tuesday June 16th, 2015 approx. 02:30 PM
Location	San Carlos Reservation
Incident Commander	Barrett/Johnson(t)
Incident Description	Multiple Objective Fire

Current Situation

Total Personnel	265
Size	33,633 Acres
Percent of Perimeter Contained	42%
Fuels Involved	Grass, Oak, Juniper, Chaparral, Ponderosa Pine

http://inciweb.nwcg.gov/incident/4304/

Posted on: 06/24/15 11:56 pm

News Article Regarding Sawmill and Whitetail Fires

Whitetail and Sawmill fires continue to burn
Posted: Tuesday, Jun 23rd, 2015 at http://www.silverbelt.com/v2_news_articles.php?heading=0&story_id=6900&page=77

San Carlos — According to the latest press release provided to the media, the Whitetail Fire has grown to approximately 11,500 acres and continues to burn in rugged grassland and woodland terrain in the central San Carlos Apache Reservation.

The Sawmill Fire, also on the reservation, is approximately 15 miles east of the Whitetail Fire and in similar terrain. Winds are pushing both fires in various directions through steep terrain as they progress in an easterly direction. Both fires are being managed to meet multiple objectives including habitat, watershed, and forage improvement.

The public is asked to avoid roads and areas near the fire due to heavy fire traffic and fire hazards. Road 1200 to Blue River, and roads 1220, 1400, and 1500 near the fire should be avoided. Safety for firefighters and the public is the number one priority. If community members are planning to be near Warm Springs, please be aware of potentially heavy fire traffic. Fire vehicles may also be coming through town, so drive with caution.

Air quality may be compromised by smoke during early morning or late evening inversions. This may cause problems for people who are ill or have respiratory problems. If possible, these people should stay indoors during periods that smoke is visible.

The incident commanders are Nate Barrett and Brad Johnson, IC-Trainee. Both fires were caused by lightning.

Resources assigned include the Geronimo Hotshot crew, four 20-person Type II Initial Attack crews, four engines, and two helicopters. For more information call Valerie Azure or Gabrielle Kenton at 928-475-2326.

Attachment 4

Non-Substantive Comments on Exceptional Events Demonstration:

El Paso UTEP Monitor, June 21, 2015

Western Refining offers the following additional, non-substantive comments on TCEQ's proposed exceptional events demonstration for the El Paso UTEP monitor for June 21, 2015. We offer these additional comments to improve the document without changing its intended effect:

Page	Comment
iii	Add the acronyms "AIRS", "MDA8", and Oz-1hr.
vii	The first sentence refers to August 21, 2015, but should be a reference to June 21, 2015.
vii	The third bullet should conclude with "...and are not likely to recur at the same location," to be consistent with 40 C.F.R. § 50.1(j).
vii	Considering the photographs from the UTEP monitoring station showing the clear image of smoke on June 21, 2015, the fourth bullet may be revised to read, "are associated with satellite imagery, Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) backwards trajectories, ~~and~~ surface monitoring data, and ***visual imagery*** that show a clear causal relationship between the fires and the monitored concentrations."
vii	The last bullet should conclude with "…would not otherwise have ~~occur~~ ***occurred***."
1-2	The third paragraph (immediately above Figure 1-2) should begin with "In El Paso, mobile source emissions make up the majority of nitrogen oxides . . ."
1-4	In the paragraph before Table 1-2, it may be appropriate to begin the first full sentence on the page with, "~~TCEQ believes~~***Evidence suggests*** that several other fires further north . . ."
3-1	To improve readability, it may be appropriate to delete the first two sentences of section 3.2 and delete the sentence reading, "Given EPA's statement, one would expect that PM2.5 would break with the usual pattern and rise and fall with ozone (especially when winds were light)."
3-1	To improve clarity, the second to last sentence could be rephrased to the effect of the following: "Therefore, the TCEQ concludes that***, for the UTEP monitor on a high-ozone day,*** co-located measurements of ***ozone and PM2.5***~~pollutants~~ rising and falling together can be evidence that supports a clear causal relationship between fires and increased ozone."

Page	Comment
3-3	The design value analysis and list of First High through Fifth High values are as of August 19, 2016. This information should be confirmed to remain accurate at a date closer to submittal of the demonstration to EPA.
3-4	To improve clarity and consistency with 40 C.F.R. § 50.14(c)(3)(C), the first sentence under Figure 3-4 could be rephrased to the effect of the following: "Although the El Paso UTEP (CAMS 12) monitoring site may, on rare occasions, see maximum daily eight-hour averages of 77 ppb on days not significantly influenced by fires, the ***applicable EER requirement is for*** ~~burden of proof upon~~ the state is to demonstrate that the value is ***in excess of***~~not really caused by~~ *normal* historical fluctuation."
3-4	Verify citation for quote in the last sentence on this page.
3-4	Consider citing EPA's newly adopted rule language in 40 C.F.R. § 50.14(c)(3)(C) that states "The Administrator shall not require a State to prove a specific percentile point in the distribution of data."
3-5	Section 3.7 contains a word processing software artifact which appears as "Error! Reference source not found." The intended reference appears to be to Figure 3-2.
3-5	For clarity, consider adding a footnote to Figure 3-5 to indicate that the Chamizal CO monitoring equipment was not operational between 10:00 AM and 12:00 PM on June 21, 2015.
3-5	Clarify the legend in Figure 3-5 to indicate that the red line is CO data on June 21, 2015, the green line is 1-hour average ozone on June 21, 2015, and the gray solid and dashed lines are weekend and weekday average ozone values for the years 2010 to 2015.
3-6	Add a scale/legend to Figure 3-6 to indicate the AOD measurement associated with each color.
3-7	Add a scale/legend to Figure 3-7 to indicate the CO measurement associated with each color.
3-7	In the middle of the paragraphs, consider changing a sentence to read, "Given the errors inherent to the HYSPLIT model, one grid cell difference between the Hog fire and back trajectories is accurate enough to ~~believe~~ ***indicate*** that emissions . . ."
3-8 and 3-9	Add a legend to Figures 3-8, 3-9, 3-10, and 3-11 to indicate which trajectory height is associated with each trajectory.
3-12	The last sentence in the paragraph immediately below Table 3-2 may read more clearly if rephrased as follows: "It is ~~not~~ likely that ***no*** ~~an~~ exceedance would have occurred without the Hog fire."

Page	Comment
4-1	Correct the public comment period recited in Chapter 4, to match the dates posted on TCEQ's website and email notice, which indicated that the comment period began August 24 and ran until September 25.
Appendix A	Clarify Appendix A plots to indicate that the red lines show $PM_{2.5}$ concentrations and to indicate the time period associated with the average $PM_{2.5}$ profiles reflected by the gray lines.
Appendices A through C	TCEQ may want to provide additional commentary regarding the information in Appendices A through C and the conclusions to be drawn from them.

phelps dodge Mining Company
El Paso Operations

Phelps Dodge Refining Corporation
897 Hawkins Blvd., El Paso, TX 79915

September 20, 2016

By electronic mail: amda@tceq.texas.gov

Re: TCEQ Proposed Ozone Exceptional Event Demonstration
El Paso UTEP Monitor, June 21, 2015 8-hour Ozone Reading

Dear Sir or Madam:

Freeport-McMoRan, El Paso Operations appreciates the opportunity to file these comments on the TCEQ's proposed exceptional events demonstration for the El Paso UTEP monitor ozone reading on June 21, 2015.

TCEQ's Exceptional Events Demonstration Package, dated September 30, 2016, identified how wildfires in southwestern New Mexico and Eastern Arizona caused elevated ozone levels at the El Paso UTEP ozone monitor on June 21, 2015. Moreover, the Exceptional Events Demonstration Package met its burden to demonstrate that the wildfires (1) were not reasonably preventable or controllable; (2) were caused by lightning and human activity and not likely to recur; (3) were associated with data showing a causal relationship between the wildfires and the monitored concentrations; (4) were associated with measured concentrations in excess of normal historical fluctuations; and (5) caused an exceedance of the ozone NAAQS that otherwise would not have occurred.

The Exceptional Events Demonstration Package is highly significant to the El Paso area, because it demonstrates that the area should not be designated nonattainment for the ozone NAAQS. A nonattainment designation creates substantial work for the TCEQ in revising the state implementation plan; imposes significant costs on local industry, which in turn increases the costs of necessities such as gasoline and electricity; and unnecessarily put a stigma on the area making it more difficult to attract new businesses.

At the same time, a nonattainment designation would do little to improve air quality or public health in El Paso. El Paso and the TCEQ cannot reduce emissions from outside of Texas even if those out-of-state emissions bear a significant share of the responsibility for the measured ozone levels in El Paso. Freeport-McMoRan, El Paso Operations concurs with the TCEQ that the available evidence suggests that wildfires in Arizona and New Mexico contributed significantly to the elevated ozone levels detected at the UTEP monitor on June 21, 2015 and therefore qualify as an exceptional event. We therefore support the TCEQ's proposed Events Demonstration Package, dated September 30, 2016.

Sincerely,

John P. Quinn

John P. Quinn
General Manager

GREATER EL PASO CHAMBER OF COMMERCE

By electronic mail: amda@tceq.texas.gov

Re: TCEQ Proposed Ozone Exceptional Event Demonstration
El Paso UTEP Monitor, June 21, 2015 8-hour Ozone Reading

Dear Sir or Madam:

The Greater El Paso Chamber of Commerce appreciates the opportunity to file these comments on the TCEQ's proposed exceptional events demonstration for the El Paso UTEP monitor ozone reading on June 21, 2015. The Greater Chamber represents more than 1,600 businesses in the region. In our mutual efforts with the City and other economic development organizations in the region, we have been successful in growing our economic base, reflected in our lowest unemployment rate in more than 25 years (4.1).

The exceptional events demonstration is highly significant to the El Paso area, as it may cause the area to avoid an ozone nonattainment designation. A nonattainment designation creates substantial work for the TCEQ in revising the state implementation plan; imposes significant costs on local industry, which in turn increases the costs of necessities such as gasoline and electricity; and may put a stigma on the area making it more difficult to attract new businesses.

At the same time, a nonattainment designation would do little to improve air quality or public health in El Paso. El Paso and the TCEQ cannot reduce emissions from outside of Texas even if those out-of-state emissions, including our neighboring city of Ciudad Juarez, Mexico, bear a significant share of the responsibility for the measured ozone levels in El Paso. Even so, the monitored ozone levels are only slightly above the national ambient air quality standards set by the EPA, and are within levels that the EPA deemed safe in 2008.

The Greater El Paso Chamber of Commerce concurs with the TCEQ that the available evidence suggests that wildfires in Arizona and New Mexico contributed significantly to the elevated ozone levels detected at the UTEP monitor on June 21, 2015 and therefore qualify as an exceptional event. We therefore support the TCEQ's proposed exceptional events demonstration.

Respectfully,

Richard E. Dayoub
President and CEO

TEXAS
ASSOCIATION OF
MANUFACTURERS

September 15, 2016

Delivered via email to amda@tceq.texas.gov
Mr. Richard Hyde
Executive Director, MC-109
Texas Commission on Environmental Quality
Post Office Box 13087
Austin, Texas 78711-3087

RE: Comments on TCEQ Demonstration Document for a June 21, 2015, Exceptional Event at the El Paso UTEP (CAMS 12) Monitoring Site

Dear Mr. Hyde:

The Texas Association of Manufacturers (TAM) appreciates the opportunity to file comments on the Texas Commission on Environmental Quality's (TCEQ) proposed exceptional events demonstration for the El Paso UTEP monitor ozone ready on June 21, 2015.

TAM represents over 500 large and small companies from every manufacturing sector, employing more than 894,000 Texans with an average compensation of $79,350 a year (the highest in the private sector). Manufactured goods account for 94.6 percent of all Texas exports, and Texas has held the distinction as the number one exporting state in the United States for several consecutive years.

The exceptional events demonstration is highly significant to the El Paso area, as it may cause the area to avoid an ozone nonattainment designation. A nonattainment designation creates substantial work for the TCEQ in revising the state implementation plan; imposes significant costs on local industry, which in turn increases the costs of necessities such as gasoline and electricity; and may put a stigma on the area making it more difficult to attract new businesses.

At the same time, a nonattainment designation would do little to improve air quality or public health in El Paso. El Paso and the TCEQ cannot reduce emissions from outside of Texas even if those out-of-state emissions bear a significant share of the responsibility for the measured ozone levels in El Paso. Even so, the monitored ozone levels are only slightly above the national ambient air quality standards set by the EPA and are within levels that the EPA deemed safe in 2008.

TAM concurs with the TCEQ that the available evidence suggests that wildfires in Arizona and New Mexico contributed significantly to the elevated ozone levels detected at the UTEP monitor on June 21, 2015, and therefore qualify as an exceptional event. We therefore support the TCEQ's proposed exceptional events demonstration.

If you have any questions or need additional information, please do not hesitate to contact me.

Yours respectfully,

Richard A. Bennett
President

TXOGA
TEXAS OIL & GAS ASSOCIATION | SINCE 1919

Jonny Jones
Chairman

D. Todd Staples
President

September 25, 2016

By electronic mail: amda@tceq.texas.gov

Re: TCEQ Proposed Ozone Exceptional Event Demonstration
El Paso UTEP Monitor, June 21, 2015 8-hour Ozone Reading

Dear Sir or Madam:

The Texas Oil & Gas Association ("TXOGA") appreciates the opportunity to file these comments on the Texas Commission on Environmental Quality's ("TCEQ") proposed exceptional events demonstration for the El Paso UTEP monitor ozone reading on June 21, 2015. TXOGA is a non-profit corporation representing the interests of the oil and natural gas industry in the State of Texas. Founded in 1919 and currently representing more than 5,000 members, TXOGA is the largest and oldest petroleum organization in Texas. The membership of TXOGA produces in excess of 90 percent of Texas' crude oil and natural gas, operates nearly 100 percent of the state's refining capacity and is responsible for the vast majority of the state's pipelines. The oil and natural gas industry not only produces the products we use every day; it anchors our state's economy. In 2015 Texas' oil and natural gas industry paid $13.8 billion in taxes and royalties that directly fund our schools, roads and emergency services.

TXOGA supports TCEQ's proposed ozone exceptional events demonstration. The exceptional events demonstration is highly significant to the El Paso area, since it materially influences the outcome of the upcoming designations under the 2015 ozone NAAQS. Nonattainment designations should not impose "unreasonable planning requirements on state, local, and tribal air quality agencies related to violations of the NAAQS due to exceptional events."[1] Accordingly, a 2005 amendment to the Clean Air Act called for EPA to establish procedures "to exclude air quality monitoring data that is directly due to exceptional events from use in determinations by the [EPA] Administrator with respect to exceedances or violations of the national ambient air quality standards."[2], EPA implemented this legal framework by developing the Exceptional Events Rule (EER)[3] in March of 2007. In an effort to further stream-line the application of this important tool, EPA recently proposed changes to the EER.[4]

TXOGA concurs with the TCEQ that the available evidence suggests that wildfires in Arizona and New Mexico contributed significantly to the elevated ozone levels detected at the UTEP monitor

[1] https://www.epa.gov/air-quality-analysis/treatment-data-influenced-exceptional-events Accessed 9/13/16.
[2] Clean Air Act §319(b)(3)(B)(iv), 42 U.S.C. § 7619(b)(3)(B)(iv), as enacted by Pub. L. 109-59, Title VI, § 6013(a), 119 State. 1882 (Aug. 10, 2005).
[3] cite
[4] Treatment of Data Influenced by Exceptional Events, 80 Federal Register 72840 (Nov. 20, 2015).

on June 21, 2015 and therefore air monitoring data from that day should be excluded from the calculation of the design value under the EER. The resultant design value indicates attainment with the 2015 ozone NAAQS. TXOGA appreciates TCEQ's appropriate application of this important tool. We recognize that the preparation of an exceptional event demonstration can be resource intensive, particularly under the 2007 exceptional events rule.

Thank you for the opportunity to comment on this important matter. Should you have any questions, please contact me at mruckel@txoga.org.

Sincerely,

Mari Ruckel

Mari Ruckel
Vice President, Government & Regulatory Affairs

City Manager's Office

September 26, 2016

Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087

RE: Ozone Flag – Public Comment on Exceptional Event Demonstration, El Paso UTEP (CAMS 12) Monitoring Site

To Whom It May Concern:

The City of El Paso submits its comments on the Exceptional Event Demonstration Package prepared by the Texas Commission on Environmental Quality (TCEQ) concerning the June 21, 2015, monitoring data at the El Paso UTEP (CAMS 12) Monitoring Site. The City reviewed TCEQ's Demonstration Package and conclusions regarding the measured ozone concentration level on June 21, 2015, and unreservedly agrees that this monitoring data was influenced by an exceptional event and should be excluded from nonattainment review in accordance with EPA's Exceptional Event rule.

The City is obviously very concerned with air quality in the El Paso area and is committed to staying in attainment with the national ambient air quality standards. The area has worked hard to improve air quality and ozone levels have continued to decline over the past fourteen years notwithstanding El Paso's growth in population and Ciudad Juarez being located immediately across the U.S. border, with its 1.3 million population.

The June 21, 2015 monitoring data was impacted by an exceptional event for which the local area had no control, that being a natural wildfire located over 155 miles away in another state. EPA in its adoption of the Exceptional Events rule observed that Congress added this provision to the CAA to provide statutory relief so that an area is not designated as nonattainment due to an exceptional event of this type. The wildfires were an exceptional event and El Paso should be afforded the relief provided by Congress.

The City has reviewed the CAA Section 319 statutory provisions, EPA's exceptional event rules, and TCEQ's draft Demonstration Package concerning the June 21, 2015, CAMS 12 monitoring data. After its detailed review the City agrees that the information provided in the Demonstration Package conclusively establishes that the June 21, 2015 CAMS 12 monitoring data was impacted from wildfires in Arizona and New Mexico, and satisfies the exceptional event criteria identified in CAA Section 319(b)(1)(A) and EPA rules. The package demonstrates that:

- The wildfires affected air quality in the El Paso area.
- The wildfires were not reasonably controllable or preventable.
- The primary wildfire, the Hog fire in Arizona, was a natural event started by a lightning strike, and the other contributing wildfires were either natural events or caused by a human activity that is unlikely to recur at a particular location.

City Manager's Office

The Demonstration Package also provided detailed information to justify excluding the monitoring data in accordance with EPA Exceptional Event rules found at 40 CFR Section 50.14. The Demonstration Package showed:

- There is a clear causal relationship between the June 21, 2015 monitored levels and the wildfire transport. Using a combination of technologies TCEQ showed that an ozone plume containing pollutants associated with the wildfires passed through the CAMS 12 monitor site on June 21, 2015.
- The monitored ozone concentration of 77 ppb on June 21, 2015 was clearly in excess of normal fluctuations. When compared to the previous six years of data the levels at this monitor exceeded the 99th percentile of data for the seven-month ozone season, and exceeded the 99th percentile of data on a 12-month basis.
- There would have been no exceedance or violation but for the wildfire event. When compared to a similar atmospheric day, the only difference to account for the higher concentration on June 21, 2015 was the transported emissions from the wildfire in Arizona.

TCEQ requested comments on the draft Demonstration Package by September 25, 2016, which is a Sunday; however, TCEQ rules provides that any deadline falling on a Sunday will conclude on the next business day, and the TCEQ nonattainment staff also confirmed in a phone discussion that TCEQ would accept comments filed on Monday, September 26.

The City appreciates TCEQ's efforts in preparing the detailed Demonstration Package, and in its on-going efforts to protect air quality in the El Paso area. Please let me know if there is anything that my staff or I can do to assist as TCEQ submits this Exceptional Event request to the EPA.

Sincerely,

Tomás González
City Manager

Cc: Mayor and City Council
Sylvia Borunda Firth, City Attorney
Erich Birch, Attorney at Law
Khalil Zaied, Deputy City Manager for Public Works

Addendum to City of El Paso comments on the draft TCEQ Exceptional Event Demonstration, El Paso UTEP (CAMS 12) Monitoring Site

The following minor issues were noted during review of the Demonstration Package:

Page 3-5, second paragraph under Section 3.7. Typo:
"Error! Reference source not found." is imbedded in this paragraph.

Page 3-5, Figure 3-5. Comments:

- The legend "6/21/2015" should perhaps be "CO Concentration."
- Should there be some explanation for the missing segment of the red data line?
- For people who are color blind, and if the document is copied in black & white, the green and red data lines might be indistinguishable (this comment also applies to several other charts in the Demonstration Package).

Page 3-6, Figure 3-6. Comment:
There is no legend on this figure, and the significance of the colored areas is unclear.

Page 3-7, Figure 3-7. Comment:
There is no legend on this figure, and the significance of the colored areas is unclear.

Page 3-7. Suggested edit:
~~"Given the errors~~ Taking into account the margin of error inherent to the HYSPLIT model, one grid cell difference between the Hog fire and back trajectories is sufficiently accurate ~~enough~~ to ~~believe~~ demonstrate that emissions from the Hog fire influenced ozone levels at the El Paso UTEP (CAMS 12) monitoring site."

Page 3-8, first paragraph on page. Suggested edits:
"Figure 3-9: *Forward Trajectories from the Hog fire Arriving at the El Paso UTEP (CAMS 12) Site*, ~~provides an excellent example of how close~~ shows that emissions from the Hog fire came directly to the El Paso UTEP (CAMS 12) monitoring site."

Page 3-12, first paragraph on page. Suggested edit:
"The surrogate day analysis suggests the 7 ppb ozone was unaccounted for under similar conditions and this could only be attributed to wildfire emissions. It is not likely that an exceedance would have occurred without the Hog fire."

El Paso Electric

September 26, 2016

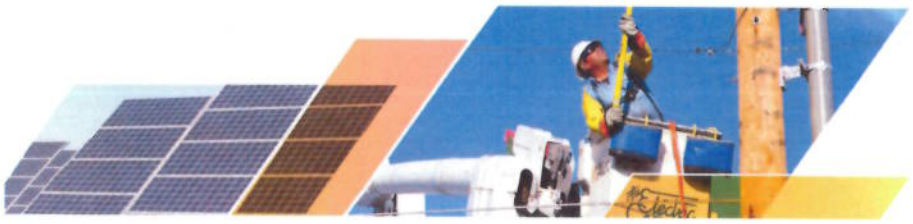
Via Email
Office of Air
Texas Commission on Environmental Quality
Austin, Texas 78711-3087
Email: amda@tceq.texas.gov

Re: El Paso Electric Company
TCEQ Proposed Ozone Exceptional Event Demonstration
El Paso UTEP Monitor, June 21, 2015 8-hour Ozone Reading

El Paso Electric Company (EPE) appreciates the opportunity to file comments regarding the Texas Commission on Environmental Quality (TCEQ) proposed exceptional events demonstration for the University of Texas at El Paso (UTEP) monitor ozone reading on June 21, 2015.

EPE is a public utility that generates, transmits and distributes electricity across a 10,000 square miles service territory in the Rio Grande Valley of west Texas and south central New Mexico. With three different generating stations in Texas, including 12 permitted electric generating units (EGUs) located in El Paso County, EPE stands to be significantly impacted by the proposed TCEQ recommendation to the U.S. Environmental Protection Agency (EPA) that El Paso County be designated a nonattainment area under the 2015 ozone national ambient air quality standards (NAAQS).

The subject exceptional events demonstration is highly significant to EPE, as it may impact the ozone nonattainment designation ultimately made for a significant portion of our service area. A nonattainment designation is generally very concerning to key stakeholders, as it creates substantial regulatory agency effort to revise the state implementation plan; it imposes significant costs on regulated entities in facility planning, siting, permitting and operation; and, it may create a negative stigma on the area making it more difficult to attract new businesses. At the same time, a nonattainment designation in and of itself would do little to improve air quality or public health in El Paso. El Paso and the TCEQ cannot reduce emissions from outside of Texas even if those out-of-state emissions bear a significant share of the responsibility for the measured ozone levels in El Paso. Even so, the monitored ozone levels are only slightly above the national ambient air quality standards set by the EPA, and are within levels that the EPA deemed safe in 2008.



P.O. Box 982, El Paso, Texas 79960
100 N. Stanton, El Paso, Texas 79901
1-800-592-1634 | (915) 543-5711 | epelectric.com

El Paso Electric

EPE supports the June 21, 2015 Exceptional Event Demonstration for El Paso UTEP (CAMS 12) Monitoring Site demonstration package submitted by the TCEQ to the EPA. The report demonstrates that wildfire occurring in southeastern Arizona at the Coronado National Forest (Hog Fire), started from a lightning strike on June 17, 2015, led to elevated emissions of ozone precursors that were transported to El Paso UTEP (CAMS 12) monitoring site. The events produced two consecutive, one-hour ozone concentrations of 97 parts per billion (ppb), and subsequently, a maximum eight-hour average of 77 ppb for June 21, 2015. The events leading to the ozone exceedance fulfill the four requirements that, collectively, define an exceptional event (as per the Clean Air Act):

1. ***The event affected air quality.*** The maximum daily eight-hour ozone average concentration for June 21, 2015 at 77 ppb was outside of normal historical fluctuations. Based on 2010-2015 data, the percent rank on an annual and seasonal basis for June 21, 2015 maximum concentration was above the 99th percentile.

2. ***The event was not reasonably controllable or preventable.*** The event started because of a lightning strike (natural event) and was outside of the State of Texas. Clearly Texas had no ability to prevent it or control it.

3. ***The event was caused by human activity that is unlikely to recur at a particular location or was a natural event.*** The event started because of a lightning strike, a natural event.

4. ***There exists a clear causal relationship between the specific event and the monitored exceedance.*** Both ozone and fine particulate matter ($PM_{2.5}$) emissions obtained from CAMS 12 station for June 21, 2015, exhibit consistent high levels typical of wildfire emissions. In fact, $PM_{2.5}$ behavior on that day was different from its usual diurnal pattern in that particular site, which tends to be opposite that of ozone. In addition, emission levels for ozone and carbon monoxide (CO) at CAMS 41 in El Paso, were also high, consistent with plumes originating from the Hog fire. Finally, air parcel trajectories modeled with the Hybrid Single-Particle Lagrangian Integrated Trajectory Model (HYSPLIT) for that day shows forward trajectories from the Hog fire traveling over CAMS 12 monitoring site, and back trajectories from the CAMS 12 monitoring site miss the Hog fire by the width of one grid cell, with the strong likelihood that pollutants were mixed and transported to the monitoring site.

While EPE recognizes that TCEQ's decision to recommend El Paso County as a new nonattainment area is based on the County having regulatory ozone monitors with a 2013 – 2015 design value exceeding 70 parts per billion (ppb), EPE respectively reminds TCEQ that these design values do not solely reflect the air shed over which TCEQ has jurisdiction. El Paso is a

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uniquely situated border city of which the air shed is undeniably influenced by industry and mobile sources on both sides of the international border.

Based on EPE's history of serving the border region, EPE reiterates EPA's conclusions that ozone and ozone pre-cursor emissions from international sources can prevent domestic ambient concentrations from achieving attainment levels[1] and that the influence of international sources on domestic ozone levels is greatest along the United States' southern border[2].

In addition to international influences, EPE previously requested TCEQ consider data regarding exceptional events in making its final designation for El Paso County. This demonstration is one such event, and EPE concurs with the TCEQ that the available evidence suggests that wildfires in Arizona and New Mexico contributed significantly to the elevated ozone levels detected at the UTEP monitor on June 21, 2015, and therefore qualifies as an exceptional event. EPE supports the TCEQ's proposed exceptional events demonstration.

Thank you for your favorable consideration of these comments. If you have any questions, please contact me at (915) 521-4698, or at linda.barker@epelectric.com.

Sincerely,

Linda J. Barker
Director – Environmental, Health & Safety

[1] *See* National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65,298, 65,468 (October 26, 2015).

[2] *See id.* at 65,444.

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The Senate of The State of Texas

Senator Craig Estes
District 30

September 21, 2016

By Electronic Mail: *amda@tceq.texas.gov*

RE: TCEQ Proposed Ozone Exceptional Event Demostration; El Paso UTEP Monitor, June 21, 2015 Eight-Hour Ozone Reading

Dear Sir or Madam:

Thank you for the opportunity to provide my comments on the Texas Commission on Environmental Quality's (TCEQ) proposed exceptional events demonstration for the El Paso UTEP monitor's ozone reading on June 21, 2015. In my role as Chair of the Texas Senate Committee on Natural Resources and Economic Development, which has jurisdiction over bills dealing with both air quality and economic development, I wanted to share my views on this issue.

I believe the evidence is overwhelming that the abnormally high ozone levels reflected by the UTEP monitor were caused by wildfires in Arizona and New Mexico states, which Texas had no ability to prevent or control. Under these circumstances, the high reading on that day should be designated as an exceptional event and should not be used to measure ozone levels in El Paso County.

If the abnormally high reading on June 21, 2015, is not designated as an exceptional event, it may cause El Paso County to be designated a non-attainment area under the Clean Air Act. Non-attainment designations impose massive burdens on local businesses and industry, increase the cost of necessities like fuel and electricity to consumers, and make it much more difficult to attract new development.

El Paso County already struggles economically, having been ranked 216 out of 254 Texas counties for per capita income during the 2010 Census, despite the presence of a major city within its lines. By way of a reference point, Travis, Harris, Dallas, and Bexar Counties ranked 12th, 34th, 37th, and 72nd, respectively. I fear that designating El Paso County non-attainment will only aggravate its

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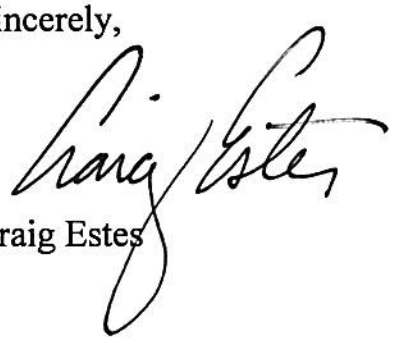
economic problems, and I fully support TCEQ's proposal to designate it as being in attainment or unclassifiable.

Please do not hesitate to contact my office if you have any other questions.

Sincerely,



Craig Estes

CE/jb